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XXI.—*On the Hymenoptera collected in New Caledonia by P. D. Montague in* 1914. By ROWLAND E. TURNER, F.Z.S., F.E.S.

THE small collection on which this paper is founded was made by the late P. D. Montague in New Caledonia in the year 1914. The types are in the British Museum. A few of the species show a relationship to the Queensland fauna, but absolutely no connection with New Zealand. Of the twenty-eight species noticed, three are undoubtedly recent importations; it is remarkable that none of these have so far been recorded from Australia. Only two other Hymenoptera were included in Mr. Montague's collection, both of them belonging to the Chalcididæ, each represented by a single specimen, one in poor condition, the other belonging to the genus *Podagrion*.

Family **Evaniidæ**.

Evania levipetiolata, sp. n.

♂. Niger, rŭgose punctatus, sparse albopilosus; tibiis tarsisque anticis brunneis; alis sordide hyalinis, stigmate venisque fusco-ferrugineis; petiolo nitido.
Long. 4 mm.

♂. Face opaque, very finely and closely punctured and clothed with short white pubescence, with a strong longitudinal carina; cheeks a little shorter than the second joint of

the flagellum. Front and vertex closely and coarsely punctured ; posterior ocelli twice as far from each other as from the eyes. Scape shorter than the combined length of the two basal joints of the flagellum ; second joint of the flagellum equal to the third, twice as long as the first. Thorax and median segment coarsely rugosely punctured, without spots of white pubescence ; parapsidal furrows distinct ; the surface of the truncation and sides of the median segment coarsely reticulate ; pronotum straight anteriorly, the angles not rounded. Metasternal processes parallel, small. Petiole twice as long as the distance separating it from the scutellum, entirely smooth and shining. Hind tibiæ with very feeble spines on the outer margin, the longest calcar about half as long as the hind metatarsus.

Hab. Mt. Ignambi, 2200 ft., August 14.

The sculpture, except on the face and petiole, resembles that of *E. impressa*, Schlett., but the petiole is much longer and more slender than in the male of that species.

Family **Braconidæ**.

Ipobracon novocaledonicus, Szépl.

Ipobracon novo-caledonicus, Szépl. Ann. Mus. Nat. Hungar. iv. p. 564 (1906). ♀.

Bracon Quodi, Vachal, Revue d'Entomologie, xxvi. p. 121 (1907). ♀.

Hab. Pt. Ngea, January 14, 1914 ; 1 ♂, 2 ♀ ♀.

Cyanopterus rutilans, sp. n.

♀. Rufa ; capite, antennis, valvulisque terebræ nigris, abdomine ferrugineo ; pedibus flavis, coxis rufo-testaceis ; alis anticis fuscis, fere ad medium flavis ; stigmate flavo ; macula sub stigmate flavo-hyalina ; posticis fuscis, dimidio basali flavis.

Long. 9 mm. ; terebræ long. 2·5 mm.

♀. Smooth and shining ; antennæ nearly half as long again as the whole insect ; front minutely punctured and clothed with sparse, short, fulvous hairs ; palpi flavo-testaceous. Parapsidal furrows distinct, but very shallow. First tergite as broad at the apex as long ; second tergite with an oblique depression on each side at the base, nearly twice as broad at the apex as long and a little more than half as broad again at the apex as at the base. Basal angles of the third tergite with small but distinct areas ; second suture smooth, broadly but feebly arched in the middle ; valvulæ stout, somewhat thickened at the apex. Stigma large, about half as broad as long ; recurrent nervure received distinctly

before the apex of the first cubital cell; first abscissa of the radius short, about one-fifth of the length of the second, first abscissa of the cubitus straight.

Hab. Plaine des Lacs, February 26, 1914; 1 ♀.

Nearly allied to the Australian *C. rufus*, Szép., and *C. profiscator*, Fabr., but has the terebra much shorter than in either. The hind legs are without black as in *C. crassicaudis*, Szép., but the terebra is much shorter than in that species.

Bracon conspiciendus, sp. n.

♀. Rufa; capite, antennis, terebræ valvulis, abdomineque, segmentis duobus basalibus exceptis, nigris; tergito secundo apice late nigro; pedibus flavo-testaceis; alis anticis fuscis, basi fere ad medium flavis; stigmate maculaque sub stigmate flavis; posticis flavis, tertio apicali fusco-hyalinis.

Long. 8 mm.; terebræ long. 2 mm.

♀. Smooth and shining; head transverse, slightly narrowed behind the eyes; front subopaque and very finely punctured on the sides, with sparse short black hairs, smooth in the middle. Antennæ as long as the whole insect, scape smooth and shining above, clothed with short sparse hairs beneath. Parapsidal furrows distinct, smooth. First tergite with a deep longitudinal groove on each side; second tergite strongly bisinuate at the base, twice as broad at the apex as at the base, about half as long again as the basal breadth, much longer than the third tergite; valvulæ stout and clothed with short black hairs; hypopygium acute, not reaching beyond the apical tergite. Stigma large, half as broad as long; cubitus sharply bent downwards a little beyond one-third from the base of the first cubital cell; recurrent nervure received just before the apex of the first cubital cell, almost interstitial; first abscissa of the radius about two-fifths of the length of the second, the third a little longer than the second. Tibiæ and tarsi clothed with short golden pubescence; hind calcaria short, about one-quarter of the length of the hind metatarsus.

Hab. Mt. Mou, March 12, 1914; 1 ♀.

This is nearly related to *Bracon walkeri*, Turn., from N. Australia, the colour of the wings and the neuration being almost identical. But in *walkeri* the abdomen is wholly red, the terebra slightly shorter and the second tergite a little narrower at the base.

Family Ichneumonidæ.

Subfamily *Pimplinæ*.

Genus Notiopimpla, Vachal.

Notiopimpla, Vachal, Revue d'Entomologie, xxvi. p. 118 (1907).

As Vachal has described four species of this genus and has not selected a type, I select *N. priocnemidea*, Vachal, as the type of the genus. This is a synonym of *Lissopimpla semipunctata*, Kirby; the generic name *Lissopimpla*, Krieclib., 1889, has priority over *Notiopimpla*. *L. semipunctata* is a common Australian insect. The three other species described by Vachal under the generic name *Notiopimpla* belong to the genus *Echthromorpha*, Holmg. *Notopimpla*, Krieg., is a different genus.

Lissopimpla pacifica, Morl.

Lissopimpla pacifica, Morl. Revision of Ichneumonidæ, ii. p. 35 (1913). ♀.

Hab. Mt. Mou, March 12, 1914; 1 ♂.

Echthromorpha quodi, Vachal.

Notiopimpla Quodi, Vachal, Revue d'Entomologie, xxvi. p. 119 (1907). ♀.

Echthromorpha exquisita, Morl. Revision of Ichneumonidæ, ii. p. 40 (1913). ♀ ♂.

Hab. Mt. Mou, March 14; 1 ♀. Kuakué, May 13, 1914; 1 ♂, 1 ♀.

Morley has overlooked Vachal's paper, hence the synonymy in this genus.

Echthromorpha ceramocare, Vachal.

Notiopimpla ceramocare, Vachal, Revue d'Entomologie, xxvi. p. 119 (1907). ♀.

Echthromorpha bitecta, Morl. Revision of Ichneumonidæ, ii. p. 39 (1913). ♂.

Hab. Mt. Mou, March 18; 1 ♀. Dumboa, January 29, 1914; 1 ♀.

Echthromorpha platymischa, Vachal.

Notiopimpla platymischa, Vachal, Revue d'Entomologie, xxvi. p. 120 (1907). ♀.
Echthromorpha inermis, Morl. Revision of Ichneumonidæ, ii. p. 46 (1913). ♂.

Hab. New Caledonia.
Not taken by Mr. Montague.

Theronia simillima, sp. n.

♀. Fulvo-testacea; antennis valvulisque terebræ nigris; scapo subtus testaceo; mandibulis flavis, apice nigris; alis nitidis, flavidescentibus, venis fuscis, stigmate fulvo-testaceo.
Long. 10 mm.; terebræ long. 3·5 mm.

♀. Mandibular teeth almost equal in length, the lower slightly the longer; temples and cheeks not buccate; clypeus transversely deflexed before the apex; antennæ 39-jointed. Carina of the mesosternum well defined; parapsidal furrows distinct, but very shallow; scutellum obliquely depressed anteriorly. Metapleural carinæ distinct and complete; median areola of the median segment not closed at the apex. First tergite distinctly less than twice as broad at the apex as at the base; terebra more than half as long as the abdomen. Hind tarsi not infuscate, the apical half of the tarsal ungues only black.

Hab. Ngoé, May 18; 1 ♀.

Very closely allied to *T. fumipennis*, Morl., from N. Queensland, differing in the yellower colour of the wings, in the colour of the hind tarsi, which are black in *fumipennis*, and in the distinctly slenderer first abdominal segment. The antennæ in the type of *fumipennis* have forty-one joints.

Phytodietus australocaledonicus, sp. n.

? *Ophion australocaledonicus*, Montr. Ann. Soc. Linn. Lyon, n. s. xi. p. 248 (1864).

♀. Nigra; facie macula rotunda, clypeo basi, tegulis, scutello in medio, postscutello macula mediana, scutello postscutelloque linea apicali, segmentoque mediano fascia transversa curvata utrinque postice pallide flavis; pedibus anticis intermediisque testaceis, coxis intermediis nigris; terebra ferruginea, valvulis nigris; alis subhyalinis, iridescentibus, venis nigris.
Long. 9 mm.; terebræ long. 4 mm.

♀. Antennæ nearly as long as the whole insect, 39-jointed,

third joint nearly half as long again as the fourth. Eyes separated from the base of the mandibles by a distance equal to about one-quarter of the length of the third antennal joint. Head, thorax, and median segment opaque, the face very minutely and closely, the clypeus rather more strongly, punctured. Posterior ocelli a little further from each other than from the eyes; the head transverse, broader than the thorax. Parapsidal furrows distinct, but shallow; median segment not strongly convex, with an almost obsolete median sulcus, minutely punctured, broader than long. Abdomen shining, microscopically punctured, not petiolate; the first segment twice as broad at the apex as at the base, more than twice as long as its apical breadth, longer than the second segment. Tarsal ungues strongly pectinate. Areolet triangular, with a short petiole, receiving the second recurrent nervure at the apex; nervulus interstitial.

Hab. Mt. Mou, March 15; 1 ♀.

Subfamily *Ophioninæ*.

Henicospilus montaguei, sp. n.

♀. Testacea; antennis nigris, basi testaceis; alis hyalinis, iridescentibus, stigmate venisque nigris; cellula cubitali macula curvata brunnea.

Long. 16 mm.

♀. Very slender. Face very minutely and closely punctured; ocelli large. Antennæ measuring 17 mm. in length, the scape and four basal joints of the flagellum testaceous. Mesonotum subopaque, not punctured. Median segment smooth and shining at the base, the apical slope behind the transverse carina coarsely rugose. First abdominal segment long and slender, slightly swollen towards the apex; second about as long as the third and fourth combined, very slender, not compressed laterally, the apical half slightly swollen; the remaining segments strongly compressed laterally. Corneous spot in the cubital cell large at the base, narrow and curved strongly.

Hab. Mt. Mou, February 15; 1 ♀.

This somewhat resembles the Queensland species *H. turneri*, Morl., especially in the black stigma, but is without the second spot in the cubital cell, and the apical abdominal segments are not black as in that species.

Subfamily *Cryptinæ*.

Buodias unicolor, sp. n.

♀. Nigra, pedibus palpisque rufo-testaceis; antennis 32-articulatis, articulo quinto apice, articulis 6–13 omnino, 14–15 supra albido-flavis; alis fuscis, venis nigris.
Long. 15 mm.; terebræ long. 4·5 mm.

♀. Third and fourth antennal joints long, about equal in length, the fifth distinctly shorter, the joints beyond the fifth diminishing rapidly in length. Clypeus and face closely punctured; front above the base of the antennæ smooth and shining, somewhat concave, with a low carina reaching to the anterior ocellus, ocellar region finely punctured, vertex smooth and opaque. Clypeus strongly depressed at the apex, the apical margin transverse. Eyes separated from the base of the mandibles by a distance equal to the length of the third joint of the fore tarsi. Pronotum rounded at the angles; mesonotum closely punctured-granulate, the parapsidal furrows deep; mesopleuræ and mesosternum closely punctured, the longitudinal groove between them well developed, mesosternum with a low transverse carina anteriorly; mesopleuræ anteriorly with a marginal carina. Scutellum smooth and shining, strongly convex, with a deep transverse depression at the base; postscutellum obliquely striated. Median segment broader than long, with a small smooth and shining rectangular enclosed area at the base; from each hind angle of the area runs an oblique carina not quite reaching the lateral margin of the segment, the portion of the segment before the carina irregularly punctured-rugulose; the portion behind the carina punctured-rugose, obliquely striated in the middle and also at the base of the posterior truncation; the spines at the hind angles of the dorsal plane stout and well developed; the apex of the dorsal plane is somewhat elevated in the middle and almost carinated in the middle of the apical margin. Abdomen shining; the first segment smooth, longer than the second, the basal half forming a petiole, the apical half rapidly broadened, half as broad at the apex as the second segment, the spiracles nearer to each other than to the apex of the segment; the remaining segments closely and minutely punctured; the second segment longer than broad; the abdomen about half as long again as the head and thorax combined. Areolet rectangular, much longer than high, receiving the second recurrent nervure close to the apex.

Hab. Mt. Canala, June 12 ; 1 ♀.

I doubt if the differences between *Buodias* and *Skeatia* are of generic importance.

Family Thynnidæ.

Eirone obtusidens, sp. n.

♂. Niger ; mandibulis, apice excepto, clypeo, scapo subtus, macula obliqua utrinque inter antennas, orbitis internis, orbitis externis latissime, pronoto margine antico, callis humeralibus, tegulis, mesonoti dimidio apicali linea longitudinali utrinque, scutello macula magna utrinque angulis basalibus, maculaque parva sub alis flavis ; femoribus, tibiis tarsisque testaceis ; scutello macula magna apicali, postscutello, segmento mediano, tergitisque secundo, tertio quartoque testacco-ferrugineis ; alis flavo-hyalinis, venis testaceis.

Long. 12 mm.

♂. Mandibles much broadened to the apex, the outer tooth acute, the inner tooth not well defined, represented by a broad oblique cutting-edge. Clypeus short and broad, scarcely at all convex, produced triangularly at the apex, sparsely punctured and sparsely clothed with long blackish hairs. Interantennal prominence bilobed, not strongly raised. Head transverse, shining and sparsely punctured. Antennæ shorter than the abdomen, third joint of the flagellum distinctly longer than the second, the four apical joints slightly arcuate beneath. Thorax and median segment shining, sparsely punctured, the punctures on the median segment very shallow ; anterior margin of the pronotum distinctly raised and thickened. Abdomen narrow and elongate, segments 2–6 parallel-sided ; very sparsely punctured, the segments scarcely constricted at the base, sternites finely aciculate and more closely punctured than the tergites, the sides of the segments sparsely clothed with black hairs. Seventh tergite long, subtruncate at the apex, rather deeply punctured ; eighth sternite much longer than broad, narrowly subtruncate at the apex, with an apical fringe of short fulvous hairs, not projecting beyond the seventh tergite. Second and third abscissæ of the radius subequal, second recurrent nervure received just beyond one-third from the base of the third cubital cell.

Hab. Noumea, January 23.

Not very near any Australian species of the genus, differing both in the form of the mandibles and of the clypeus. The apical joints of the maxillary palpi are not slender or elongate.

Family **Scoliidæ.**

Scolia (*Dielis*) *novocaledonica*, nom. nov.

Elis formosa, Sauss. Spec. Gen. *Scolia*, p. 208 (1861). ♂ (nec ♀, nec Guér.).

This male is described by Saussure as the male of *formosa*, Guér., but his determination of *formosa* was wrong, the name being applied by him to the common Australian species previously described by him as *tasmaniensis*. True *formosa*, Guér., was described from a female taken in New Ireland, and apparently always has the second recurrent nervure incomplete. Males taken with a female corresponding to Guérin's description in North Queensland differ widely from New Caledonia males, as also does the male of *tasmaniensis*, Sauss. The male of *novocaledonica* closely resembles that of *aurulenta*, Sm., a common Malayan species, but has the first abdominal segment shorter and less narrowed to the base and the seventh tergite and hypopygium narrower, the lateral spines of the latter being nearer to each other than in *aurulenta* ♂. A female from New Caledonia, doubtless the female of *novocaledonica*, closely resembles typical *aurulenta*, but differs in the form of the apex of the radial cell, which is much more oblique and more distant from the costa, produced a little further beyond the second transverse cubital nervure, and more narrowly rounded at the apex; the orange abdominal fasciæ are also much broader than in typical Philippine specimens, though specimens from Ceram have the fasciæ almost as broad. The long calcar of the hind tibia is twice as long as the shorter one, spathulate at the apex, and only a little shorter than the hind metatarsus in *novocaledonica*, whereas in *aurulenta* it is only about two-thirds of the length of the hind metatarsus and more acute at the apex. The puncturation of the scutellum and median segment is also distinctly sparser in *novocaledonica* than in *aurulenta*, especially in the middle. I have not seen Philippine specimens of ♂ *aurulenta*, but several of both sexes from Ceram and Amboina. In the male of *novocaledonica* the radial cell is more truncate at the apex than in *aurulenta*.

The male is the type.

Hab. Mt. Tong-houé, January 26; 6 ♂♂. Kuakué, May 14; 3 ♂♂. Paompai, September 15; 1 ♀.

E. septemcincta, Fabr., is the male of *E. radula*, Fabr., and not connected with the present species as Saussure thought possible.

Family **Psammocharidæ**.

Priocnemis caledonicus, Vachal.

Priocnemis caledonicus, Vachal, Revue d'Entomologie, xxvi. p. 116 (1907). ♀ ♂.

Hab. Noumea, January 24; 2 ♀ ♀. Plaine des Lacs, February 12–20; 6 ♀ ♀.

Closely allied to Australian species of the group of *P. australis*, Guér.

Family **Sphegidæ**.

Ampulex compressa, Fabr.

Hab. Noumea, January and February; several specimens of both sexes.

This species, probably indigenous in S. India and Ceylon, and ranging as far as Hongkong, has been imported into E. Africa, St. Helena, and other localities, but not into Australia.

Sceliphron hemipterum, Fabr.

Sphex hemiptera, Fabr. Suppl. Entom. Syst. ii. p. 244 (1798).
Sceliphron hemipterum, Saussure, Grandidier, Hist. Madagascar, xx. p. 440 (1892). ♀ ♂.
Sceliphron Quodi, Vachal, Revue d'Entomologie, xxvi. p. 116 (1907). ♀.

Hab. Noumea, January 20–February 1, 1914; 3 ♀ ♀. Also from Madagascar, Mauritius, and the Seychelles.

Evidently an imported species.

Chlorion (*Proterosphex*) *fumipennis*, Sm.

Sphex fumipennis, Sm. Cat. Hym. B.M. iv. p. 249 (1856). ♀ ♂.
Sphex antennata, Sm. Cat. Hym. B.M. iv. p. 252 (1856). ♂.

Hab. Noumea, February 1, 1914; 3 ♀ ♀. Kuakué, May 13; 1 ♀. Plaine des Lacs, February 20; 1 ♂. New Caledonia, without other data; 3 ♂ ♂. Also from the whole of Australia (*fumipennis* typical), and from Aneiteum, New Hebrides (*antennata* type).

Kohl gives *fumipennis* as a variety of *luctuosus*, Sm., but the males show that they are specifically distinct. Vachal records *Sphex nitidiventris*, Sm. (= *S. refulgens*, Kohl), from New Caledonia, but this is almost certainly an error of identification. The colour of the wings is not quite as dark in the insular specimens as in the Australian form, but I can find no structural difference.

Notogonia clypeata, Sm.

Larrada clypeata, Sm. Ann. & Mag. Nat. Hist. (4) xii. p. 294 (1873). ♀.

Hab. Noumea, January 20, 1914; 1 ♂. Also from Api, New Hebrides.

Pison rechingeri, Kohl.

Pison rechingeri, Kohl, Wien. Denkschr. Akad. Wiss. lxxxi. p. 309 (1908).

Hab. Noumea, January 20–24, 1914; 2 ♀ ♀. Also from Samoa, Tonga, and Fiji.

This is probably the species identified by Vachal with doubt as *P. punctulatum*, Kohl.

Family **Eumenidæ**.

Eumenes germaini, Lucas.

Eumenes Germaini, Lucas, Ann. Soc. Ent. France, (5) v., Bull. p. lxxvi (1875).

Hab. Noumea, January 20–24; 7 ♀ ♀.

Odynerus caledonicus, Sauss.

Odynerus (*Leionotus*) *Caledonicus*, Saussure, Etud. Fam. Vespidæ, i. p. 205 (1852). ♂.

Hab. Noumea, January 17–23; 1 ♂, 4 ♀ ♀. Pt. Ndea, January 14; 1 ♀.

Odynerus quodi, Vachal.

Odynerus Quodi, Vachal, Revue d'Entomologie, xxvi. p. 115 (1907).

Hab. Noumea, January 24; 1 ♀.

Family **Vespidæ**.

Icaria duchaussoyi, Grib.

Icaria Duchaussoyi, Grib. Miscell. Ent. iv. p. 13 (1896).

Hab. Baie Ouemo, April 7; 7 ☿ ☿.

Polistes macaensis, Fabr.

Vespa macaensis, Fabr. Ent. ii. p. 259 (1793).

Hab. Baie Ngo, February 10–11; Noumea, January 16–22.

Doubtless an imported species. It also occurs throughout Southern Asia, in most of the islands in the Indian Ocean, also in Fiji, Tahiti, and Hawaii.

Family **Apidæ**.

Nomia sicheli, Vachal.

Nomia sicheli, Vachal, Miscell. Ent. v. p. 92 (1897).

Hab. Noumea, January 23; Baie Ngo, February 10; Baie Ouemo, March 28.
A good series taken.

Megachile australis, Lucas.

Megachile australis, Lucas, Ann. Soc. Ent. France, (5) vi. p. 303 (1876). ♀.

Hab. Noumea, January 23; 1 ♂. Mt. Canala, June 12; 1 ♀.

Megachile albomarginata, Sm.

Megachile albomarginata, Sm. Descr. New Spec. Hymen. p. 66 (1879). ♀.

Hab. Noumea, January 22–February 1; 2 ♀ ♀. Mt. Mou, March 12; 1 ♀. Baie Ouemo, March 28; 3 ♂ ♂, 7 ♀ ♀.

XXII.—*Descriptions and Records of Bees.*—LXXXV.

By T. D. A. Cockerell, University of Colorado.

Anthophora borneensis (Cockerell).

Both sexes from Sandakan, Borneo (*Baker*). Described as a variety of *A. zonata*. *A. zonata*, var. *andrewsi*, Ckll., also comes from Sandakan (*Baker*).

Crocisa insulicola, sp. n.

♀.—Agrees with *C. amata*, Ckll., from Formosa, except as follows: black band across mesopleura narrower; anterior thoracic spots larger, separated by a space in middle no wider than the median stripe; axillæ with rather large blue spots; pygidial plate of abdomen narrower and shining at end, the median keel weak. (In

amata the plate is broader at end, with the median keel very strong, and the axillæ have at most a few blue hairs.) Compared with *C. reducta*, Ckll., from Singapore, it is smaller, with the scutellum less deeply incised, the bands at sides of third abdominal segment entire (broken in *reducta*), and spots on fifth segment with posterior side oblique.

Island of Penang (*Baker*, 9595).

Were the range of this insect continuous with that of *C. amata*, it would be regarded as a local race or subspecies; but as it occurs in an island so remote from Formosa, it may represent a parallel or convergent type, not derived from the *amata* stock. It is quite distinct from the other Penang species, *C. ridleyi*, Ckll., and *C. callura*, Ckll.

Crocisa angulifera, sp. n.

♀.—Similar to *C. decora*, Smith, from Singapore, but differing thus: anterior spots on thorax separated by an interval equal to the length of one; median stripe narrower; discal spots much smaller; axillæ without spots; inner margins of scutellar lobes without a double curve; basal band of abdomen hardly half as broad; angular projections of blue at sides of first segment very sharply pointed; bands on following segments narrower, and truncate mesad. The black band on pleura is extremely broad. The basitarsi have blue hair on outer side. The scutellum is without blue spots.

♂.—Similar; going to *C. emarginata*, Lep., in Friese's table, but with large teeth on hind femora beneath.

Sandakan, Borneo (*Baker*, 9597, 9596). The female is the type.

Xylocopa collaris, Lepeletier.

A female from Sandakan, Borneo (*Baker*, 9603), has the band of white hair on thorax anteriorly narrowed, essentially as in subsp. *penangensis*. In a female from "Wahnes S.," South-east Borneo (*Wolf v. Schoenberg*), this band is very broad. Is this a matter of individual variation or dimorphism, or are there two races in Borneo? The Sandakan insect is not *penangensis*, as it differs in the male.

Trigona itama, Cockerell, variety *a*.

A specimen from the Island of Penang (*Baker*, 9590) appears to belong to *T. itama*, having a hairy scutellum and all the general features of that species. It differs in having

the face more or less reddish, the malar space largely red, the postscutellum red, and the abdomen reddish brown basally. The wings are somewhat darker than in typical *T. itama*. Possibly the specimen is somewhat immature, but it may well represent a distinct race.

Trigona melanocephala, Gribodo.

Sandakan, Borneo (*Baker*, 9588).

Trigona geissleri, Friese, variety *a*.

A male from Sandakan, Borneo (*Baker*, 9387), differs in having the hind tibiæ narrower and the tegulæ redder, but in general it has exactly the characters of *geissleri*. A worker from the same place (*Baker*, 9586) has the flagellum black or nearly so above, except at extreme base, and ferruginous beneath. It differs from the Singapore workers, formerly referred to this species, by the darker flagellum, pure black eyes, and dusky sepia-coloured stigma and marginal nervure. It differs from *T. iridipennis* by the dusky wings.

Trigona confusella, sp. n.

Trigona geissleri, Singapore specimens, Cockerell, Ann. & Mag. Nat. Hist., Oct. 1918, p. 385.

Worker.—Length 4–4·5 mm.

Black, with broad abdomen, which may be dark brown or pure black; wings long, very distinctly reddish, but not dark, with clear light ferruginous stigma and nervures; mandibles and labrum red; clypeus dusky red; face covered with thin pale greyish tomentum; antennæ ferruginous, more or less dusky above; tegulæ dark reddish; front and mesothorax polished; scutellum strongly projecting, with much black hair; small joints of tarsi ferruginous.

Singapore (*Baker*).

In Bingham's table this falls in section C, and runs out because the mesothorax is entirely black.

Trigona sandacana, sp. n.

Worker.—Length about 6·5 mm., anterior wing 6·5 mm.

Shining black, with the abdomen fulvo-ferruginous, the apical part somewhat dusky; head large; mandibles black;

malar space well developed; antennæ black, with scape red at extreme base, and flagellum dusky castaneous beneath; face with a little pale greyish hair, but disk of clypeus nude and polished; occiput with abundant stiff black hair; mesothorax and pleuræ with thin short pale tomentum and scattered erect black hairs; scutellum with long black hair; dorsal surface of metathorax very large, smooth, and highly polished; tegulæ dark rufous. Wings hyaline, stained with ferruginous, the apical field whitish; nervures and stigma clear ferruginous. Legs black, with black hair, tarsi red at extreme apex. Abdomen moderately broad.

Sandakan, Borneo (*Baker*, 9593).

Resembles *T. castanea* (*Melipona castanea*, Bingh.), but that has the head and thorax mainly castaneous. Also resembles *T. flaviventris*, Friese, but that has the wings quite differently coloured.

Trigona hæmatoptera, sp. n.

Worker.—Length 6·6 mm., anterior wing 7·5 mm.

Shining black, including the broad abdomen and the legs, except that the tarsi are reddened apically; head large; sides of face with thin inconspicuous pale hair; occiput with stiff black hair; mandibles dark castaneous; scape dark castaneous, flagellum nearly black, except at base; thorax above with stiff black hair, but without any distinct pale tomentum; pleura with black hair, the lower part with slightly pallid hair; tegulæ ferruginous. Wings very strongly reddened, the nervures and stigma ferruginous; trochanters with a red stripe above. Legs with black hair; hind tibiæ very broad apically. Abdomen with the first two segments highly polished, the others dullish.

Sandakan, Borneo (*Baker*, 9592).

Resembles *T. melanotricha*, Ckll., but easily separated by the very red wings and smaller, paler tegulæ.

Trigona atomella, sp. n.

Worker.—Length 2·5 mm.

Head, thorax, and legs shining black, small joints of tarsi testaceous; abdomen rather dilute sepia-brown, the hind margin of first segment broadly pellucid whitish; front with a deep median sulcus; mandibles and labrum ferruginous; malar space short and black; lower part of clypeus suffusedly reddish; face canescent with thin white hair; scape ferruginous, flagellum blackish; scutellum fringed

with pale hair; tegulæ rufo-piceous. Wings hyaline, faintly dusky, stigma and nervures dilute sepia. Abdomen rather broad, shining.

Island of Penang (*Baker*, 9585).

Related to *T. canifrons*, Sm., but known by the minute size.

Trigona breviceps, sp. n.

Worker.—Length about 6 mm.

Shining black, the legs and antennæ black, but scape testaceous at extreme base; head unusually broad and short, the facial quadrangle very broad; malar space short; mandibles and labrum black; occiput with erect black hair; thorax above with black hair; tegulæ black. Wings dilute fuliginous, stigma and nervures dark brown. Abdomen moderately broad.

Sandakan, Borneo (*Baker*, 9591).

Related to *T. itama*, Ckll., but easily separated by the shorter head and shorter malar space.

Ceratina sexmaculata, Smith.

Sandakan, Borneo (*Baker*, 9280).

Ceratina penangensis, sp. n.

♂. (Type.)—Length about 6·5 mm.

Closely and strongly punctured; general colour olive-green, shaded with brassy, the sides of face almost golden, sides of front flushed with lilac, disk of mesothorax strongly suffused with lilac; abdomen beyond the third segment glaucous-green, the hind margin of fourth flushed with golden, especially in middle; mandibles black; labrum with a large semicircular yellow mark, emarginate above; clypeus with a broad yellow band, having a triangular expansion on each side below; antennæ black; area of metathorax shining golden, emarginate posteriorly in middle; tegulæ black. Wings strongly dusky; second s.m. narrowed almost to a point above, and receiving first r. n. far beyond middle; anterior femora and tibiæ with a yellow stripe on outer side; hind tibiæ with a yellow spot at base; abdominal segments 2 and 3 each with a pair of transverse smooth lines; end of abdomen broadly truncate, the corners of the truncation obtuse, and with a small dentiform angle at each side; underside of abdomen banded with light glaucous-green.

♀.—Length about 8 mm.

Labrum wholly black; yellow clypeal band very broad, without lateral extensions; yellow marks on legs reduced to a small spot at base of anterior tibiæ. The tubercles are not yellow in either sex. The ♀ has the second s.m. much broader above.

Type (♂) from Island of Penang (*Baker*); ♀ from Singapore (*Baker*, 9288).

By the bronzy colour it resembles *C. corinna*, Nurse, but that has yellow clypeus and tubercles.

Ceratina ridleyi, Cockerell.

Island of Penang, a typical male (*Baker*, 9284).

Ceratina xanthura, sp. n.

♂.—Length 8 mm.

Similar to *C. ridleyi*, but differing thus: smaller; no black bands at sides of clypeus; supraclypeal area yellow with black corners; sides of prothorax pale yellow; metathorax all yellow except a broadly triangular basal area; first abdominal segment yellow with two black marks; two very broad pale yellow bands occupying bases of second and third segments and narrower apices of the ones before; apex weakly tridentate as in *C. ridleyi*, but broader and reddish yellow instead of black. The last character also distinguishes it from *C. kosemponis*, Strand, which is closely allied, and agrees in the yellow face. The yellow mark above the eyes is large and fusiform, not minute as in *C. flavopicta*, Sm. The mesothorax has four yellow stripes; the scutellum, axillæ, and postscutellum are yellow.

Island of Penang (*Baker*, 9285).

The following table separates a series of species related to *Ceratina hieroglyphica*, Smith, but apparently distinct from it and from each other. There is a good deal of confusion concerning *hieroglyphica*; thus a specimen received as such from Mr. Sladen, collected in the Khasia Hills, India, proves to be really *C. lepida*, Smith. This is the specimen referred to in Ann. & Mag. Nat. Hist., Dec. 1899, p. 406. Smith himself evidently confused more than one species under *hieroglyphica*, since he gives the distribution as Northern India, Hong Kong, and the Philippine Islands.

In the table below, *C. hieroglyphica* falls with *incerta*, and the latter may prove to be no more than a subspecies, but there is a marked difference in the colour of the legs:—

	Females	1.
	Males	4.
1.	Lateral face-marks divided. (Philippine Is.)	*tropica*, Crawford.
	Lateral face-marks entire	2.
2.	Pleura with a yellow spot behind each tubercle	*accusator*, Ckll.
	Pleura without such spots	3.
3.	Tubercles black	*pyramidalis*, Ckll.
	Tubercles yellow	*incerta*, Ckll.
4.	Abdomen beyond third segment entirely black, except a small inconspicuous spot on each side of fourth	*selangorensis*, Ckll.
	Abdomen beyond third segment banded with yellow	5.
5.	Apex with a conspicuous median point; sixth segment with a large yellow mark	*collusor*, Ckll.
	Apex without a distinct point, if any	6.
6.	Upper end of clypeus broadly black	*accusator*, Ckll.
	Upper margin of clypeus narrowly black	7.
7.	Thorax laterad of parapsidal grooves with a large impunctate area, on which is a yellow mark; hind tibiæ black with about basal half of outer side yellow; hind basitarsi black; tegulæ piceous with rufous margins	*incerta*, Ckll.
	Thorax laterad of parapsidal grooves entirely black and without punctureless area; hind tibiæ yellow, black on apical half within; hind basitarsi yellow; tegulæ testaceous	*conscripta*, Ckll.

Ceratina pyramidalis, sp. n.

♀.—Length a little over 9 mm.

Black, including legs, antennæ, and mandibles, but with the following bright yellow markings: U-shaped mark on labrum, cone-shaped or pyramidal mark on clypeus, broad but short lateral face-marks (not reaching level of antennæ), broad stripes (as long as eyes) on cheeks; slender line at each side of prothorax on upper margin, large mark on scutellum deeply notched in front, short line on post-scutellum, median mark on first abdominal segment, transverse mark at each extreme side of third, interrupted band (very slender sublaterally) on fourth, entire band (very slender laterally) on fifth segment. Tegulæ rufo-piceous; wings dilute fuliginous; mesothorax, except anteriorly, polished and impunctate.

Singapore (*Baker*, 9282).

Related to *C. perforatrix*, Smith, but the clypeal mark is quite differently shaped, and the legs have pale hair. It may be no more than a subspecies, but at present intermediates are unknown.

Ceratina incerta, sp. n.

♀.—Length 7·5–9·5 mm.

Black, including antennæ, mandibles, labrum, and greater part of legs; bright yellow markings as follows: reversed T (with very broad stem and long arms) on clypeus, supraclypeal band (angulate above in middle), claviform lateral face-marks (the narrow upper end above level of antennæ), pair of frontal spots, band on cheeks (but no spots above eyes), upper margin of prothorax (slightly interrupted in middle), apical half of tubercles, broad subtriangular area on scutellum, mark on apical part of anterior femora, anterior tibiæ on outer side except apex (on inner face they are rufous), median mark on first abdominal segment, slender band on second segment interrupted in middle but swollen to a large patch at each side, broadly interrupted band on third segment, narrowly interrupted one on fourth, entire band on fifth having middle third broad and lateral thirds linear; four rather short slender lines on mesothorax. Mesothorax at sides densely punctured to level of anterior end of lateral yellow stripes, and beyond that polished; tegulæ piceous margined with rufous. Wings dusky; hind tibiæ with a prominent spine on outer side before the middle; anterior coxæ with a large tubercle in front.

♂.—Length about 7 mm.

Characters as given in table above; also the following: labrum with a yellow spot; clypeus yellow, with narrow black upper and lateral margins; yellow on front legs more extensive; middle tibiæ yellow on outer side; band on second abdominal segment reduced to the lateral patches; sixth segment with a large yellow patch; apical plate without a projecting point.

Singapore, both sexes (*Baker*, 9283); Island of Penang, male (*Baker*, 9290). The type is a female from Singapore.

Readily known from the true *C. hieroglyphica* by the absence of yellow on middle and hind legs of female, and the long lateral face-marks and cheek-bands. Compared with *C. morawitzii* the female has a higher clypeus, differently shaped lateral marks, &c.

Ceratina conscripta, sp. n.

♂.—Length about 6 mm.

Similar to *C. incerta*, but differing as shown in table above. Labrum yellow except at sides; antennal fossæ

very deep; lateral face-marks filling space between clypeus and eye, but above that linear, restricted by the fossæ; scape black, with a minute yellow mark at extreme base; band on cheeks restricted to upper part; yellow of prothorax continuous with that of tubercles; knees, tibiæ, and tarsi all yellow, the middle and hind tibiæ with black mark on inner side; first abdominal segment with a yellow band, excavated posteriorly on each side.

Island of Penang (*Baker*, 9286).

The yellow marks have been reddened by cyanide. Resembles *C. morawitzii*, but the end of the abdomen is quite different.

Ceratina selangorensis, sp. n.

♂.—Length about 6 mm.

Markings in general similar to other males of this group, but with the following special characters: stripe on cheeks slender and rather short; lateral face-marks claviform, a broad black area between yellow of clypeus and of lateral marks; scape entirely black; mesothorax entirely black (the punctured area in front broad); yellow of upper border of prothorax continuous with that on tubercles; no spot behind tubercles; yellow patch on scutellum broad and obtuse laterally; knees, tibiæ, and tarsi yellow, all the tibiæ with a large patch on inner side; first abdominal segment with a small spot at each side, but no median one; second and third segments with a large mark on each side, but no band; fourth with minute very obscure lateral spots; remaining segments wholly black. Clypeus high, with a delicate median keel and a few large punctures; tegulæ rufo-testaceous. Wings moderately dusky; lateral areas of mesothorax well punctured, with a small shining space posteriorly; area of metathorax rugose; apical plate of abdomen broadly rounded, with a minute inconspicuous median point.

Selangor, Malay Peninsula (*Baker*, 9287).

I follow the spelling of the locality on the label. Wallace's map has it Salangore, while Bartholomew's Atlas has Selangore.

Ceratina collusor, sp. n.

♂.—Length about 7 mm.

Markings as usual in the group, but with the following special characters: labrum yellow except at sides; clypeus with only a slender black marginal line; lateral face-marks

with upper part evanescent; scape with a large yellow spot at base and a smaller one at apex; yellow of upper border of prothorax continuous with that on tubercles; no spot behind tubercles; mesothorax with four rather short stripes; yellow area on scutellum very large, quadrate, about twice as broad as long; about half of anterior femora, and all of their tibiæ and tarsi yellow; middle and hind knees, and tibiæ on outer side, yellow; middle tarsi pallid, but hind basitarsi blackened; first abdominal segment with a band enclosing two black spots; second segment with entire band, having median angle, and greatly enlarged at sides; third with slightly interrupted band; fourth and fifth with bands and sixth with a large yellow patch. Clypeus with three faintly indicated keels; lateral areas of mesothorax with posterior half impunctate; area of metathorax with little sculpture; anterior coxæ prominently angulate; apex of abdomen with a median denticle. Tegulæ rufous; wings dusky.

Singapore (*Baker*, 9281).

Allied to *C. acuticauda*, Ckll., from Java, but that has the scape black and the apical plate of abdomen subangulate laterally. Also allied to *C. philippinensis*, Ashm., which it resembles in the ornamentation of the scape, but differing in the sculpture of lateral areas of mesothorax.

Ceratina accusator, sp. n.

♀. (Type.)—Length about 6·3 mm.

Black, with the tarsi ferruginous, and bright yellow markings as follows: reversed **T** on clypeus (with stem shorter than arms), supraclypeal band, frontal spots, rather narrow claviform lateral face-marks (the lower end turned inward, the upper going to level of antennæ), rather long stripe on cheeks, upper border of prothorax, tubercles, spot behind tubercles, four stripes on mesothorax (the lateral ones very short), semicircular patch on scutellum, anterior femora apically, middle knees, anterior and middle tibiæ on outer side, spot at extreme base of hind tibiæ, double median spot on first abdominal segment and indistinct lateral ones, sides of second and third segments with large marks resembling a hand with index-finger pointed, and bands on fourth and fifth segments, narrowed sublaterally. Scape slender, reddened in front, especially toward base; lateral areas of mesothorax with posterior half impunctate; base of metathorax finely rugose; tegulæ ferruginous. Wings brownish; hind tibiæ with a small projection on outer side; hind tibiæ

with very long hair; underside of abdomen with glittering white hair.

♂.—Length about 5·5 mm.

Like the female, but clypeus yellow except the sides and very broad upper margin; labrum with a very large yellow spot; supraclypeal mark broadly triangular; scape black, faintly reddish at extreme base; stripe on cheeks shorter; all the tibiæ yellow on outer side; band on sixth abdominal segment. Apex of abdomen broadly rounded and obtuse.

Island of Penang (*Baker*, 9289).

Related to *C. obtusicauda*, Ckll., from Java, but distinguished by the spot behind tubercles, a character of *C. philippinensis*. The specific name is derived from the marks at the sides of the second and third abdominal segments, resembling hands pointed at each other in accusation. The sculpture of the lateral areas of mesothorax is unlike that of *C. philippinensis*.

XXIII.—*On a new Genus and Species of Bird of the Family* Drepanididæ *from the Hawaiian Islands.* By R. C. L. Perkins, D.Sc., F.Z.S.

Dysmorodrepanis, gen. nov.

Nearest to *Psittacirostra*, but distinguished primarily by the form of the beak. Maxilla strongly decurved, compressed so as to be cariniform, and extending beyond the mandible for a distance equal to one-third (or more) of its full length. The nostril is subreniform, the lower margin of the operculum being rounded; numerous antrorse pale setiform feathers project over it from the base, and a few black setæ, longer than these, reach right to the apex. Seen in profile the mandible has its upper and lower margin subparallel on the basal part, but before the middle of its length they curve strongly upwards. The tip alone is received in the maxilla, about midway between its apex and the nostril, so that for most of the length of the mandible there is a free space between its edge and that of the maxilla and no co-adaptation at all. The upper margins of the mandibles are strongly bent inwards and would afford protection to the tongue lying in the deep channel between the inner edges. The tongue, which had been dry for years, even after long soaking in water and subsequently in potash, could only be very imperfectly studied, but apparently it agrees in general with

Gadow's description of that of *Loxioides*. It is not acute at the tip and is apparently emarginate there, with the edges microscopically serrulate. The tenth primary is rudimentary as in other Drepanididæ, the sixth, seventh, and eighth are equal and form the tip of the wing; the ninth is notably shorter than these, as also is the fifth; the latter is not so short as the ninth, however, while the fourth is a little shorter; third, second, and first decreasing in length. Tail rather short. Metatarsi short, only about equal in length to those of *Oreomyza montana* of the same island, but far stronger and stouter. In front the two basal scales are not long and apparently not very clearly divided, the second being not so long as wide; the third is quite elongate, subequal to the fourth, which is twice as long as wide in this dry specimen; the fifth still more elongate and deeply emarginate at the apex, its inner apical angle strongly produced, its outer one still more strongly, so that the short scale following is deeply enclosed in the emargination.

Dysmorodrepanis munroi, sp. n.

General colour above greyish olivaceous, less grey on the middle of the back and on the rump; head above in front and an indefinite stripe above and extending behind the eyes much more yellow; underparts of neck and body entirely pale, appearing white, irregularly suffused with pale yellow. Wings with all the primaries except the outer one with very narrow but conspicuous yellowish margin outwardly, this colour becoming white (or hardly tinged with yellow) on the distal ends. The inner web is largely white in all these feathers basally, the white gradually extending on the inner primaries and in these reaching the tip of the feathers. The inner secondaries are broadly white-tipped and margined with white inwardly, the innermost ones with the whole inner web white. The breadth of the white tip decreases towards the primaries. The rectrices are dark, the outer margins narrowly olivaceous.

Mr. Munro's notes give the following additions:—"Length six inches, sex not determined, the legs muscular with strong sinews, the jaw muscles more than usually developed, skull round almost like a marble, eyes large for the size of the bird, the iris dark brown, as also the upper mandible, the lower light brown, lighter beneath; legs light slate-colour, the soles of feet yellowish."

Hab. Lanai. "This specimen, the only one of the species that I know of, was taken in the Kaiholena valley, Lanai, at

an elevation of about 2000 ft. The stomach and throat were full of the ripe berries of *Urera glabra*, which is common in the locality" (*Munro*).

Mr. Munro, who has now for some years been permanently resident on Lanai, writes further that though he thoroughly explored the forest on that island in the years 1914, 1915, 1916, and subsequently, he has only twice come across birds that he suspects of being the same species as the one described. "On March 17th, 1916, further up the same valley, where it is very densely wooded, I heard two or three birds calling to one another, the cry being less sweet and not so loud as that of the Ou (*Psittacirostra*), and I watched one on the bare branch of a tree-top a short distance away. It called regularly at intervals and kept moving its head, stretching its neck and turning on its perch without changing its place on the branch. It looked smaller than an Ou and more active, but less so than *Chlorodrepanis*. The form of its bill could not be made out, but it was not that of the latter.

"On Aug. 12th, 1918, in a patch of dry forest on the south-west side of the mountain, at about the same elevation as that where the original specimen was obtained, I saw another bird, and was near enough to note the light colouring round the eye, but not the form of beak. Some of its notes were like those of *Psittacirostra*, but others new to me, especially a low squeak or whistle, and it was too small for that bird, not so thick-set, and with a very short tail. So I feel sure it was the other."

As so few specimens have been seen by so skilled a collector, the bird must be a great rarity, but its discoverer hopes that it may increase in numbers, as the forest is now rigidly protected and rapidly recovering. When I collected on Lanai in 1893 and subsequently the forest was in a deplorable condition, being rapidly destroyed by countless wild goats, and it was also full of wild pigs and cats that had run wild. The latter, as I have elsewhere recorded, were destroying native birds wholesale. Only on the sheer sides of the mountain and on a very small part of the narrow backbone was the forest in a natural condition. Neither Lord Rothschild's collectors nor myself ever found a specimen of this bird.

The specimen obtained was in a partially moulting condition, but the wing-feathers are fully grown. The lack of adaptation of mandible and maxilla recalls the condition in *Heterorhynchus wilsoni*, but it is much more exaggerated.

Paignton,
Jan. 7th, 1919.

XXIV.—*Notes on Myriapoda.*—XVI. *Some Observations on Nomenclature.* By HILDA K. BRADE-BIRKS, M.Sc., M.B., Ch.B., L.R.C.P., M.R.C.S., and the Rev. S. GRAHAM BRADE-BIRKS, M.Sc.

In a recent contribution to this Journal (1), in which Mr. R. S. Bagnall has dealt most admirably with the synonymy of three Leachian species of Diplopoda, our colleague evidently has in view the same objects which have actuated us in preparing the present paper—in the first place, the solution of some of the nomenclatural difficulties which beset the path of the modern student of English myriapodology, and then, again, the restoration of old specific names to their rightful place in our system of classification.

Not long ago we cited (2) in tabular form the species mentioned as English by Newport in his list of 1844 (5) and his catalogue of 1856 (6), adding some remarks of our own about synonymy in the last column. On that occasion we were doubtful about the validity of a number of names in common use. The specific designations we are about to advocate in the present note are, with the exception of the last, all to be found in the first column of the table to which reference has just been made (2), and they are there prefixed by the numbers which will now be set against them.

Passing through London recently, we paid a visit to the British Museum (Natural History), where we were courteously permitted to examine some of the types referred to in Newport's list (5) and catalogue (6), as well as other dry specimens of English "Myriapoda" dating back many years, and named, therefore, no doubt according to type. Subsequently, in the present note, we shall refer to certain of these old and valuable specimens (some of which may quite well be types, even though they are not labelled as such) as "classical examples."

As a result of our examination, we feel justified in drawing attention to several points connected with nomenclature, and we now advocate the use of the specific names which head the following paragraphs.

We take this opportunity of thanking Mr. A. S. Hirst, of the Department of Zoology at Cromwell Road, for facilitating our examination of a small part of the valuable collection of specimens under his care.

Chilopoda.

5. *Lithobius melanops*, Newport.

The examination of a classical example of Newport's species confirms our contention (2) that *Lithobius glabratus*, C. L. Koch, is a synonym.

Diplopoda.

20. *Craspedosoma rawlinsi*, Leach.

We agree with Mr. Bagnall (1) in regarding *Craspedosoma simile*, Verhoeff, as a synonym.

21. *Polymicrodon polydesmoides* (Leach).

Again we agree with Mr. Bagnall (1). *Polymicrodon latzeli* (Verhoeff) must be considered as a synonym. We have seen Leach's type.

23. *Iulus* (*Ophiiulus*) *pilosus*, Newport.

A labelled classical example—a male—proves conclusively that this is *Iulus* (*Ophiiulus*) *fallax*, Meinert. As Newport's name is of earlier date, it takes precedence.

24. *Tachypodoiulus niger* (Leach).

We saw Leach's type, and, as it exhibits the characteristic striation of the prozonites of *Tachypodoiulus albipes* (C. L. Koch), the synonymy so often suggested is established in favour of Leach's name.

27. *Cylindroiulus punctatus* (Leach).

The type appears to be a female, but there can be little reasonable doubt that this is *Cylindroiulus silvarum* (Meinert). Externally the two are identical, and no other club-tailed species of these dimensions has been recorded from England. Meinert's name must therefore give place to Leach's.

28. *Brachyiulus* (*Microbrachyiulus*) *pusillus* (Leach).

We have seen Leach's type. We agree with Mr. Bagnall (1) in regarding as synonymous with this species *Brachyiulus* (*Microbrachyiulus*) *littoralis* (Verhoeff). Of course, Leach's name takes precedence.

29. *Cylindroiulus latistriatus* (Curtis).

In 1844 John Curtis, F.L.S., contributed a paper (3) to the 'Journal of the Royal Agricultural Society,' in which he gave a brief description of several English Diplopoda. One of these he calls "Julus Londinensis of *Leach*," and gives two excellent figures, which show conclusively that even at that early date the typical "*Julus*" *londinensis*, Leach, was confused with the animal often known since (especially on the continent) under that name, for Curtis's figures are obviously of *Cylindroiulus londinensis teutonicus* (Pocock), which is tailless, whereas the true *Cylindroiulus londinensis* (Leach), which Curtis *thought* he was figuring, has a clubbed tail and is a much larger animal. What Curtis meant by "Julus Londinensis of *Leach*" is important when we come to his description of "*Julus*" *latistriatus*.

Curtis (*loc. cit.*) tells us that his specimens of *latistriatus* were sent to him from Namptwich (Nantwich), Cheshire, where they constituted a pest in garden and greenhouses. In London we saw the specimens Curtis presented to the British Museum (5), and we must regard them as his types. Externally they agree with *Cylindroiulus britannicus* (Verhoeff), and when we remember that this species is well established in the north of England (it is a pest in a greenhouse at Darwen, Lancashire), we can have little doubt about the synonymy of the two. For these reasons we strongly advocate the restoration of the specific designation used by Curtis and the rejection of that of Verhoeff which was established in 1891.

Curtis's paper (3) was overlooked by Latzel when he compiled the bibliography for his monumental work (4), and it is probably unknown to many myriapodologists. We therefore append the original description of the species with which we are now especially concerned:—

"Julus latistriatus, *Curtis*, the broad-lined Snake-millipede, is 5 or 6 lines long, of a dull ochreous lilac with a purple tint, cylindrical, very shining, sparingly striated, the lines not approximating; down each side is a row of dots, and the penultimate segment is not mucronated, but slightly angulated and rounded, as in *Julus Londinensis*; the antennæ are stout and rather short, pilose and capitate, second joint the longest, the apex very pubescent."

Curtis adds that he at first took this "*Julus*" for the young of "*londinensis*," but that the striæ were twice as far apart as in any other species he had examined.

30. *Trichoblaniulus guttulatus* (Bosc).

Examination of several classical examples of *Julus pulchellus*, Leach, shows sufficiently conclusively that they are referable to the blind species *Trichoblaniulus guttulatus* (Bosc), which was established before Leach's name was given.

Although it does not concern our present study very closely, we may add that it follows, of course, that the specific name *pulchellus* is obsolete and cannot be used for the species furnished with ocelli often referred to under that name. For this animal we must in future use the later designation *Nopoiulus venustus* (Meinert).

References.

(1) Bagnall, Richard S. "On the Synonymy of some European Diplopods (Myriapoda), with Special Reference to Three Leachian Species." Ann. & Mag. Nat. Hist. 1918, ser. 9, vol. ii. pp. 407 *et seq.*

(2) Brade-Birks, Hilda K., and S. Graham. "Notes on Myriapoda.—XIII. Some Kent Records." Lancs. & Ches. Nat. 1918, nos. 126 & 127, vol. xi. pp. 152 *et seq.* & pp. 186 *et seq.*

(3) Curtis, John. "Observations on the Natural History and Economy of the Insects called Wireworms, affecting the Turnips, Corn-crops, &c.; also of their parents the Elaters or Beetles, called Skip-jacks, Click-beetles, &c." Journ. Roy. Agri. Soc. 1844, pt. 1, vol. v. pp. 180 *et seq.*, with figures.

(4) Latzel, R. 'Die Myriopoden der österreichisch-ungarischen Monarchie.' 1880–4.

(5) Newport, G. 'List of the Specimens of Myriapoda in the Collection of the British Museum.' 1844.

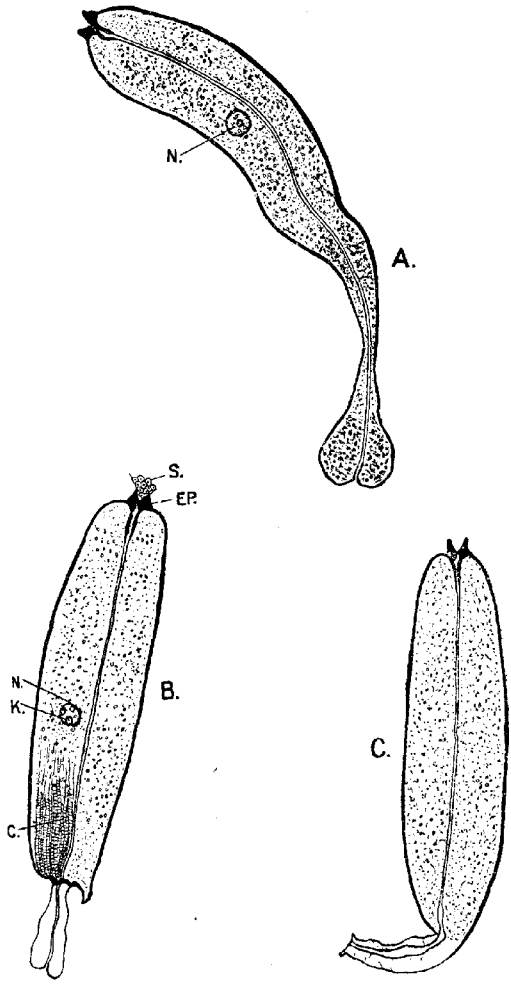
(6) ——. 'Catalogue of the Myriapoda in the Collection of the British Museum.—Pt. 1. Chilopoda.' 1856.

16 Bank Street, Darwen, Lancashire,
15th January, 1919.

XXV.—*Some Observations on* Pleurocystis cuénoti, *Hesse*, 1909, *a Cœlozoic Parasite of the Earthworm*. By W. Harold Leigh-Sharpe, B.Sc. (Lond.).

On February 14th, 1918, upon opening a *Helodrilus* (*Allolobophora*) *longus*, Ude, obtained from Red Lion Square, Holborn, London, I discovered seven specimens of diploids (fourteen individuals in all) of the gregarine parasite *Pleurocystis cuénoti*, Hesse, 1909, some of which I have herein figured.

Fig. 1.



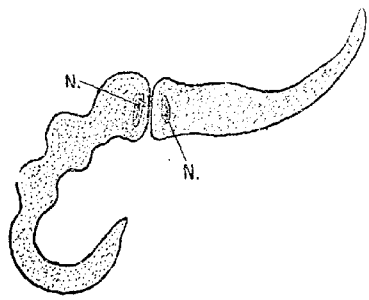
Pleurocystis cuénoti. Three diploids, **A, B, C.**

N., nucleus; K., nucleoli; EP., epimerite; C., cytomyomes; S., cells from the seminal funnel of the earthworm.

The parasites reposed in the body-cavity of the worm, in segments 10 and 11, all but one diploid being on the host's right side. They appeared of an opaque china-white colour, the largest (fig. 1, A) being 5 mm. in length, the others 4 mm. All were laterally bowed in shape, and curved round the œsophagus of the worm between the calciferous glands and the pouch, but attached by their anterior extremities to the seminal funnels. The worm had been killed an hour and a half previous to dissection by immersion in methylated alcohol, and none of the parasites showed any sign of life.

It is remarkable that such a large number of parasites should occur within one host, and curious that here we have two individuals permanently associating as one, though not conjugating.

Fig. 2.

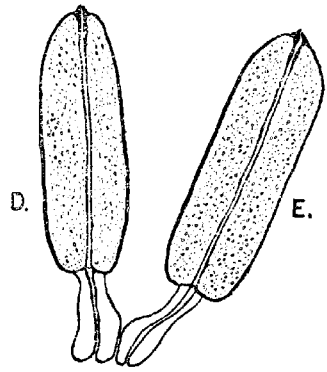


Monocystis agilis. Two conjugants in polar apposition.
N., nucleus.

The unique presumed conjugation of *Monocystis magna*, Schmidt, has been described by Cuénot (1900) alone, who gives a figure which, to my mind, is not as satisfactory as might be, since it shows the supposed conjugants so clearly as two separate individuals, instead of being apposed in such a way as to look like one individual (fig. 1), the lines of demarcation between them superficially resembling the alimentary canal of some single animal. The association in this species alone was said to be longitudinal—a fact which appears to have been known at the earliest to Bosanquet (1894), who mentions it casually in describing another species, and even admits *en passant* into his paper a very

inadequate figure. In *Monocystis agilis* and other species the application of the conjugants is polar or "end-to-end" (fig. 2). Since the parasites are attached to the seminal funnels of the hosts permanently, as all agree (and they do not become detached *post mortem*), it is the close proximity of the individuals to one another which determines their association into diploids *inter se*, which must therefore of necessity be longitudinal. A curious confirmation of this is shown in fig. 3 in the case of the diploids D and E, which are partially attached to one another at their posterior extremities, from which I infer that diploidal association probably *always begins at this end.*

Fig. 3.



Pleurocystis cuénoti. Two diploids, **D** and **E**, partially attached to one another at their posterior extremities.

But Hesse (1909) pointed out that *Monocystis magna*, Schmidt, differed so materially from other species that he proposed for it the generic name of *Nematocystis*. Further, that there was existing another animal, which, agreeing in the main with the characters of *Monocystis* rather than with those of *Nematocystis*, became coupled, in a longitudinal manner, with a partner for life like *Nematocystis*, and not merely during the process of conjugation. To this form he gave the name of *Pleurocystis cuénoti*, and, while admitting that it is very rare, remarks that the animals are always in the diploidal condition and *never found singly*. After giving

careful consideration to the matter of the claims of *Nematocystis* and *Pleurocystis* as independent genera, I have come to the conclusion that the characters of my specimens agree in the main with those diagnostic of *Pleurocystis* except in regard to a small discrepancy as to size. Hesse states that *Pleurocystis* is 2 mm. long and *Nematocystis* 5 mm., whereas my specimens are of the length of 4–5 mm. If the animal is as rare as Hesse implies, it is possible that it may attain dimensions greater than that mentioned by him, or, again, that an English variety may be larger than the French one which he found in and around Dauphiné. There exists, as far as I can ascertain, no previous record of *Pleurocystis* occurring in the British Isles, though it has possibly been found and confused with the presumed conjugation stage of *Monocystis magna*, which Hesse has now determined is not a conjugation but a life-association into diploids, thereby deciding him to alter its name to *Nematocystis magna*.

The statement of Ceconi (1903) that in *Monocystis agilis*, at any rate, each conjugant separately forms a cyst around itself, which afterwards coalesces with that of its partner, was scouted by Cuénot. Such is not true at any rate for *Pleurocystis*, where the double (cuticular) separation between the individuals is *never broken down*. The cuticle exhibits a network of fine striations, and as the cytoplasm shrinks away from it by plasmolysis, it may perhaps have been mistaken for a cyst. Some of the specimens were ruptured, and others easily became so at the slightest touch. The endoplasm was plentifully stored with paramylum (or paraglycogen). Specimen A, which is also the largest, being 1 mm. longer than any other diploid, is markedly different from the rest. It exhibits a kind of caudal formation, as though it had been killed while making Euglenoid movements; further, the cytoplasmic contents extend right to the posterior extremity, and are more densely granular. Conversely, the other specimens present a normal specific outline, the cytoplasm is withdrawn from the posterior extremity as though shrinkage was occurring previous to cyst-secretion. From these observations I infer that A is an earlier, and possibly the earliest, stage of diploid association, and that the other figures represent subsequent stages. The figures of no other observer represent any such caudal formation.

Though I have figured a nucleus in two individuals, these were not apparent through the cytoplasm; but, upon rupture of the cuticle, when the contents become extruded the nucleus is plainly visible. The nucleus is situated about halfway

along the animal, or anterior to that position (specific character), not at the extreme anterior end as in *Monocystis agilis*, is enclosed in a well-marked nuclear membrane, and contains numerous nucleoli (generic and specific character).

The posterior extremity of B exhibits, under a high magnification, in the inner portion of the ectoplasm, a layer of contractile fibrillæ which have been called myocytes, which I interpret to mean "muscle-cells." As the organism is unicellular, I propose that they be called *cytomyomes*, which I interpret as "cell-muscles."

As this species is a permanently fixed parasite upon the seminal funnels, one might reasonably expect to find some organ of attachment. As to whether one exists there appears to be some difference of opinion, none being mentioned by most of the earlier authors cited for *Nematocystis* (*Monocystis*) *magna*. I am of the definite opinion, however, that the cuticle of the anterior end is prolonged into a blunt petal-like projection (the equivalent of the epimerite of other Gregarines), which stains with picro-carmine like the remainder of the cuticle, is unprovided with hooks, and to which the cells of the seminal funnels of the earthworm are in several cases still adhering. This accords with a passage which Hesse quotes from Bütschli (1882), and not with his own observations, for while he appears to me to describe some organ of attachment, yet he denies that it is in any way an epimerite. I agree with Hesse that it comes in contact, by boring, with many host-cells, and is not attached to one only as he states is the case in *Nematocystis*.

No spermatozoa of the worm were found in the seminal vesicles, or round the seminal funnels, or attached to any of the diploids, such as other observers have figured, nor were any "tails" to be discovered. This may be because the worm had recently shed all its spermatozoa in the regular breeding-season, which obtains about this date, since the seminal vesicles were very small, or because the large number of parasites present had disintegrated and digested them all.

In specimens stained with Ranvier's picro-carmine 25 min. only the cuticle absorbed the carmine, while all the cell-contents became yellow from the action of the picric acid. In specimens stained with Meyer's hæmalum 5 min. both cuticle, cytoplasm, and nucleus became purple, as also the seminal funnel-cells of the host.

The partners of a diploid appear to adhere to one another by a mucilaginous extra-cuticular secretion of "cement"-substance analogous with that which binds the individual

cells of a filament of the alga *Spirogyra* to one another, and is affected by similar stains (*e. g.* Bismarck brown). It is unaffected by dilute (1 %) acids (*cf.* the cysts), but the individuals can be made to part from one another by pressure on the coverslip, though not without rupture of the cuticle—which is evidence against their permanent fusion into one organic individual.

Summary.

(1) *Pleurocystis* has established claims to be considered an independent genus.
(2) It occurs in the same host (*Helodrilus longus*) both in England and France.
(3) The individuals are in lifelong diploidal association, and not merely at the period of conjugation, as was supposed in *Monocystis magna*, since the nuclei show no signs of division, and it is improbable that seven presumed conjugants should be in the same initial stage.
(4) The diploids show a caudal formation, but whether this is due to Euglenoid movements or oncoming cyst secretion, or is an artefact, is uncertain.
(5) I have attempted to set forth reasons for believing that diploidal association commences at the posterior extremity of the individuals.
(6) The animals attain a greater magnitude than Hesse asserted.
(7) There is an anterior organ of attachment.
(8) The partners are firmly but not inseparably attached by an adhesive secretion, and are not permanently fused into one individual.

References.

Bosanquet. (1894). "Notes on a Gregarine of the Earthworm (*Lumbricus herculeus*)." Quart. Journ. Microsc. Sci. xxxvi. p. 421.
Bütschli. (1882). Bronn's 'Thierreich,' i. Abt. i. Leipzig.
Ceconi. (1903). "De la Sporulation de la *Monocystis agilis*, Stein." Arch. d'Anat. Microsc. v. p. 122.
Cuénot. (1900). "Recherches sur l'évolution et la conjugaison des Gregarines." Arch. Biol. xvii. p. 581.
Hesse. (1909). "Contribution à l'étude des Monocystidées des Oligochètes." Archives de Zool. experim. iii. p. 27.
Schmidt. (1854–5). "Beitrag zur Kenntniss der Gregarinen und deren Entwickelung." Abhand. herausg. von der Senckenbergischen. Naturforsch. Gesellsch. i. p. 168.

XXVI.—*Notes on Gerbils referred to the Genus* Meriones, *with Descriptions of new Species and Subspecies.* By OLDFIELD THOMAS.

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THE genus *Meriones* has long been in a very great state of confusion, partly owing to the carelessness of authors in lumping specimens from all sorts of localities together, and partly to the fact that the genus falls into groups distinguishable only by the different sizes of their bullæ, and that members of each of the groups may be found living side by side—so that a single district may contain two or three species, all looking so alike as to be readily confused with each other, and yet really distinguishable on close examination. Thus no less than three species are found in Egypt, the very country where certain names have been overlooked or misapplied—so as to add to the general confusion.

I have not been able to complete the work in any sense, but can make some preliminary observations on the habitats and characteristics of the different forms.

The bullæ, whose structure and development give the primary means of distinction, enable us to separate the species (apart from the aberrant *calurus* and *hurrianæ*) into four groups, as follows :—

(*a*) The bullæ very large, the swelling in front of the meatus projecting in front of the level of the hindmost corner of the zygomata, and the suprameatal triangle also very large. Meatal length (*i. e.* the distance from the back of the bulla to the front of the meatal swelling) approximately 14–15 mm.

(*b*) Bullæ similarly large, but the suprameatal triangle comparatively small. (Tail usually more bushy than in other species.)

(*c*) Bullæ smaller, the front side of the meatus little swollen, and not reaching to the level of the zygoma (meatal length about 11–12 mm.); triangle also small.

(*d*) Bullæ quite small for the genus, almost in normal proportion to the general size of the skull. (Meatal length in *M. blackleri* 8·2 mm.)

In Algeria the confusion of the names is too great to clear up now, but as a preliminary it may be said that north of the Atlas we have true *shawi* (group *c*), which is represented on

the plateau by *richardi* *, and south of the Atlas by *guyoni*. Then the large-bulla group *b* is represented south of the Atlas by *schousboei* (a form doubtfully separable from *libycus*), but is not found to the north of the range.

Working eastwards, we have in Tripoli local representatives of *a*, *b*, and *c* ranging widely over the country, which is not broken up by any prominent orographical features. Two of these seem to need new subspecific names.

Next, in Egypt we have first of all the comparatively bushy-tailed animal, called quite unaccountably by de Winton† "*M. crassus sellysii*" (*sic*), which was obtained by Mr. N. C. Rothschild in the Wadi Natron, and which I identify with *Meriones libycus*, Lichtenstein, the first African name in the genus, but one hitherto altogether ignored. The locality, dimensions, and the "caudâ apice floccosa" all agree with the Wadi Natron animal, and there seems no reason to doubt the identification.

With *libycus* I also synonymize Rüppell's *melanurus*, which has been a prime source of confusion, for not only did he include both Alexandria and Sinai as its habitat, but he sent out specimens under its name which are referable to forms of both group *b* and group *c*. For of the two examples of it that he sent to the British Museum no. 42. 8. 15. 2 is the bushy-tailed *b* species, while 42. 8. 15. 6 belongs to *c*.

In consequence, it appears to be necessary now for me, as the first reviser who has a knowledge of the mixture of the two species, definitely to determine on to which the name *melanurus* shall be placed.

I therefore propose formally to apply it to the one with a prominently black-tufted tail, as Rüppell evidently meant, making the name itself suitable, even though then becoming synonymous with *libycus*.

The other course would result in the species with the least black on its tail bearing the inappropriate name *melanurus*.

In order to make this definite I propose to select as a lectotype of *melanurus* B.M. no. 42. 8. 15. 2, sent as a co-type of it by Rüppell in conjunction with 42. 8. 15. 6, which is

* In dealing with Loche's many names, applied to animals with exact localities recorded, but without any mention of the bullæ, I have thought it best, in view of the admirable pioneer work he has done on the genus, to accept Lataste's reference of them to their respective groups (his "*shawi*" being *c* group and his *erythrurus b* group), and then to take the first name in each group according to its locality, and so identify them.

† Nov. Zool. x. p. 284 (1903). The type of *sclysii* was from Oran, and the name is an absolute synonym of *shawi*. On the other hand, *crassus* was from Sinai, and is a wholly different species, belonging to group *a*.

the small-bulla species with almost no black on the tail, later obtained by Dr. Anderson near Alexandria.

This case of *melanurus* is a striking example of the advisability of selecting types, a plan still resisted by naturalists of backward tendencies. Rüppell was little to blame for mixing up the two species, which are really very similar to each other; but had he selected an individual type to represent his name, all the confusion that has surrounded it would have been avoided.

In the Sudan there occurs the gerbil to which Bonhote has applied the name *M. crassus pallidus*, a form belonging to the *a* group, and undoubtedly very nearly allied to the true *crassus* of Sinai, but widely different from Lower Egyptian forms to which that name has been applied.

Further eastwards material does not exist for any general review, but a number of local forms have proved to need description. It may, however, be noted that the *Meriones* of Asia Minor and Palestine seem to be mostly of the *d* group, while the remarkable *M. calurus* of Egypt and Sinai has the bullæ of the size found in group *c*, though the suprameatal triangle is unusually small.

With regard to the aberrant *M. hurrianæ* of Baluchistan and N.W. India, I find that instead of being distinctly a desert animal, with light skull, large bullæ, and short normal claws, it is modified for a burrowing life by having a heavy bowed skull, small bullæ, and elongated digging fore-claws. It appears to me, therefore, that it ought to be generically separated from the other members of the group, and I would propose for it the name of *Cheliones**.

Meriones pallidus tripolius, subsp. n.

Group *a*. Like Sudan *pallidus* in all essential particulars, but the general colour slightly warmer, often approaching cinnamon-buff, and usually getting a little darker towards the base of the tail. Under surface usually white to the bases of the hairs, but sometimes they are pale slaty basally. White ear-patches larger and more conspicuous, generally too large to be hidden by the ear when this is folded backwards. Tail-tuft short and little developed, its hairs scarcely exceeding 10 mm.; the main part of the tail pinkish buff or cinnamon-buff, and equally buffy below; in *pallidus* it is markedly lighter, often white, below.

Skull as in *pallidus*.

* Derived from χηλή, exactly as *Meriones* is from μηρός.

Dimensions of the type:—

Head and body 129 mm.; tail 125; hind foot 30; ear 16.

Skull: median length 38·5; diagonal length 41; zygomatic breadth 21; interorbital breadth 5·9; bimeatal breadth 23·5; palatine foramina 7·1; upper molar series 5·3. Bullæ: diagonal length 16·8; meatal length 14·5; suprameatal triangle, length 6·4, height 5·7.

Hab. Tripoli. Type from Gebel Limhersuk, in the north-west part of the country.

Type. Adult male. B.M. no. 2. 11. 4. 64. Collected 19th July, 1901, by E. Dodson. Presented by J. I. S. Whitaker, Esq. Fourteen specimens examined.

This Tripoli gerbil is very closely allied to *pallidus*, but seems to differ fairly constantly in the characters above noted. The Sudan animal is itself very near to true *M. crassus* of Sinai, but has rather less enormous bullæ.

The specimens representing both this and *M. libycus caudatus* were included under *Meriones schousboei* in my account of the Tripolitan mammals presented by Mr. Whitaker in 1902 *.

M. crassus, *pelerinus*, and *pallidus* are the species with the largest bullæ and suprameatal triangles in the genus, and together form group *a*.

Meriones pelerinus, sp. n.

A species of group *a* allied to *M. crassus*, but with larger teeth and longer palatine foramina.

Size about as in *M. crassus* or a little larger. General colour paler and greyer than in that species, a little darker than "pinkish buff," the tips of the hairs blackened on the back, clearer on the sides. Belly quite white, not very sharply defined laterally. Lighter eye and ear-markings not strongly marked. Proectote of ears dark pinkish buff. Hands and feet white; soles with their posterior halves naked except just along the edges. Tail not very long, whitish buff, the terminal crest black, not heavily developed, extending along about 35 mm. at its end, its longest hairs 12 mm.

Skull, like *crassus*, with enormous bullæ, which project backwards about 3 mm. behind the level of the occiput, and have their premeatal swelling close against, and surpassing below, the posterior corner of the zygomata. Suprameatal triangle very large, with rounded angles. Palatal foramina projecting backwards between the roots of m^1.

* P. Z. S. 1902, p. 9.

Molars decidedly larger than in *M. crassus*.

Dimensions of the type (measured in the flesh) :—

Head and body 125 mm.; tail 125; hind foot 32; ear 17.

Skull: median length 39; diagonal length 41·5; condylo-incisive length 35·5; zygomatic breadth 21·8; nasals 15; breadth of brain-case 18·3; bimeatal breadth 23; palatal foramina 7·7; upper molar series, crowns 5·9, alveoli 6·5. Bullæ: horizontal diagonal length 17; length from back of bulla to front of premeatal swelling 15; suprameatal triangle, length 6·2, height 5·6.

Hab. Tebuk, on the Hedjaz Railway, N.W. Arabia. Alt. 2000′.

Type. Young adult male. B.M. no. 10. 3. 12. 5. Original number 5. Collected 3rd January, 1909, by Douglas Carruthers.

This species agrees with *M. crassus* in the very great size of the bullæ, the measurement from the back of the bulla to the front of the premeatal swelling decidedly surpassing that found either in the Egyptian or Tripolitan large-bulla forms. In correlation therewith the suprameatal triangle is of a maximum size. From that species it differs by its larger molars and the greater posterior extension of its palatine foramina.

I have taken, as representing *M. crassus*, a spirit-specimen from Mt. Hor, south of the Dead Sea, collected by Mr. H. C. Hart, of which the skull seems closely to agree with that figured by Sundevall. Another specimen in skin, from the type-locality Sinai, collected by Mr. Claude Wyatt, is noticeably more ochraceous than *M. pelerinus*, but, owing to the bullæ of this example being lost, its determination is not absolutely certain.

Meriones libycus caudatus, subsp. n.

Group *b*. Closely like true *libycus* of Lower Egypt, but with markedly longer and finer tail.

General colour above warm buff, finely ticked with brown, below white with slaty bases to the hairs, as in true *libycus*. Postauricular white patches fairly well marked. Tail decidedly longer than head and body, well-tufted, the tuft beginning halfway along the upper surface, and even below covering more than the terminal inch, the hairs attaining 16–17 mm. in length. The tuft black, the rest buffy ochraceous.

Skull apparently quite as in *libycus*, the bullæ very large, the suprameatal triangle small.

Dimensions of the type:—
Head and body 142 mm.; tail 153; hind foot 34; ear 20.

Skull: median length 40·5; diagonal length 42; zygomatic breadth 22; interorbital breadth 7·6; bimeatal breadth 23; palatine foramina 8 2; upper molar series 5·3. Bullæ: diagonal horizontal length 17·5; front of meatal swelling to back of bulla 15·1; suprameatal triangle, length 4·5, height 3·2.

Hab. Tripoli. Type from Ferdjan, a second specimen from El Hammam.

Type. Adu't male. B.M. no. 2. 11. 4. 56. Original number 97. Collected 21st June, 1901, by E. Dodson. Presented by J. I. S. Whitaker, Esq.

This is a long-tailed form of the *b* group, with largest-sized bullæ but small suprameatal triangle. It occurs between the original *libycus* of Lower Egypt and *schousboei* of Algeria, which have both comparatively short tails, and are, indeed, very doubtfully distinguishable from each other.

Meriones syrius, sp. n.

Nearly allied to *M. erythrourus*, but with longer foot and larger teeth.

General characters quite as in *erythrourus*, with the same proportions of the bulla and approximately the same coloration of body and tail. Upper surface near "pinkish buff," paler and more approaching "light buff" on sides. Under surface white, but the hairs pale slaty basally except on the chin and throat, where they are white to the roots. Light areas behind eyes and round bases of ears not strongly marked. Ears like head, the fringing hairs buffy white. Hands and feet white, more or less washed with buffy on the metapodials. Tail ochraceous, the terminal crest well developed, black, commencing rather more than halfway along the upper side.

Skull apparently like that of *erythrourus*, though rather more robustly built. Bullæ equally large, with a marked inflation on the front side of the meatus just surpassing the level of the hindermost point of the zygoma.

Incisors less bevelled and with less sharply defined groove than in *erythrourus*. Molars distinctly smaller.

Dimensions of the type:—
Head and body 142 mm.; tail 145; hind foot 35; ear 18.

Skull: median length 42·5; diagonal length to back of

bullæ 42·8; condylo-incisive length 39; zygomatic breadth 24·5; nasals 16·2; interorbital breadth 8; breadth of brain-case 18; meatal breadth 22·8; palatine foramina 7·6; upper molar series 5·8. Bullæ: horizontal diagonal length 16·2; back of bulla to front of meatal swelling 12·8; supra-meatal triangle, length 5, height 3.

Hab. Syrian Desert. Type from Karyatein (spelt Kargeten in Stieler's Atlas). Alt. 2000′. Another specimen from a point 320 km. east of the Dead Sea, 3000′.

Type. Adult male. B.M. no. 5. 7. 2. 2. Original number 27. Collected 3rd March, 1905, by Douglas Carruthers.

Of these gerbils with large bullæ—all once referred to *M. erythrourus*,—the true bearer of that name occurs in Afghanistan, ranging westwards through Persia to the edge of the highlands; then in the lower littoral country comes the smaller *M. charon*, succeeded again in the Syrian desert by the present species, which, though more like true *erythrourus*, is distinguishable by its longer feet and larger teeth.

Meriones charon, sp. n.

A small species with terminally crested tail, allied to *M. longifrons*.

Size a little less than in *M. longifrons*. General colour above finely speckled sandy buff ("pinkish buff" darkened by the brown points of the hairs), the tone warmer on the posterior back. Under surface white, the lateral line of demarcation not specially sharply defined. Cheeks greyish, the postorbital and postauricular whitish spots scarcely marked. Ears rather short, coloured like the head. Hands and feet white; soles with the median area of their proximal halves naked, their terminal halves hairy. Tail not very long, its greater portion short-haired, dull buffy, not more ochraceous than the body, its terminal 25–30 mm. with an upper crest of black hairs which may attain 15 mm. in length at the tip.

Skull very much as in *M. longifrons*, but the bullæ less swollen, their antero-internal extension considerably less. Supramеatal triangle nearly as high as long.

Dimensions of the type:—

Head and body 129 mm.; tail 132; hind foot 29·5; ear 17·5.

Skull; median length 37·2; diagonal length to back of bulla 38·3; condylo-incisive length 33·5; zygomatic breadth

20; meatal breadth 21; nasals 14·5; interorbital breadth 5·8; breadth across brain-case 17; palatine foramina 7·5; upper molar series 5·2. Bullæ: greatest diagonal horizontal length 15; back to antemeatal swelling 12·4; suprameatal triangle, length 5, height 3·5.

Hab. Coastal plain in region of Karun River, Persia. Type from Ahwaz, alt. 220′. Mound of Susa (*K. Loftus*).

Type. Adult male. B.M. no. 5. 10. 4. 38. Original number 22. Collected 30th March, 1905, by R. B. Woosnam. Presented by Col. A. C. Bailward.

This gerbil is most nearly allied to Lataste's *longifrons* from Jedda, on the Red Sea, but may be distinguished by its smaller bullæ.

Mr. Woosnam says of it in February 1905 :—"Plentiful all along the flat coast plain from Bushire to the Karun River"; but at the end of March he says "only a few here now, probably owing to failure of corn crop."

The Museum contains a specimen sent home by Kenneth Loftus from the Mound of Susa in 1853, two spirit-specimens from Ahwaz presented by Dr. Jayakar in 1900, and three excellent skins collected by Mr. Woosnam.

Meriones ambrosius, sp. n.

A naked-soled, bushy-tailed gerbil, related to *M. persicus*, but with smaller bullæ.

Size rather large. General colour above a beautiful "cinnamon-buff," slightly darker on the back, clearer on the sides, the posterior back of a rather warmer tone than the anterior; more uniform and less speckled throughout than in most species of the genus. Under surface as usual pure sharply defined white, the line of demarcation rather high up on the sides. A white spot above and behind each eye, and another above and behind the base of each ear; ear long, coloured like head. Hands and feet pure white. Soles smooth and naked posteriorly, granulated and naked anteriorly, but between the two, behind the granulations, there is an area with a certain number of small hairs on it. Tail long, rather heavily tufted terminally, the hairs attaining 20 mm. and more in length in the tuft, which is all round the tail, not specialized as a crest; main part of tail buffy, tuft dark brown.

Skull rather smaller than that of *persicus*, narrower across the brain-case, and with very much smaller bullæ. These are without any antemeatal swelling, do not project so far

backwards as the occipitals, and their postmeatal portion is but little swollen, with a straight posterior margin.

Dimensions of the type:—

Head and body 161 mm.; tail 183; hind foot 41; ear 28.

Skull: greatest length (median) 43; condylo-incisive length 38·5; zygomatic breadth 22·5; nasals 16·6; interorbital breadth 7; least breadth across brain-case 17·2; meatal breadth 21·3; palatine foramina 8·3; upper molar series 6·2. Bullæ: greatest diagonal horizontal diameter 13; distance from back of bulla to front of meatus 9; suprameatal triangle, length 3·5, height 2.

Hab. (of type). Dopulan, Bachtiari Mountains, 120 miles N.E. of Ahwaz, Persia. Alt. 6000′.

Type. Adult male. B.M. no. 5. 10. 4. 35. Original number 36. Collected 18th April, 1905, by R. B. Woosnam; presented by Col. A. C. Bailward.

In my account of the Bailward collection * I referred this exceedingly handsome gerbil to *M. persicus*; but now that I realize the systematic value of the difference in size of the bullæ, I consider it should be distinguished specifically from that animal.

Meriones isis, sp. n.

The Lower Egypt representative of the *c* group, that of which *M. shawi* is typical.

Size rather less than in true *shawi*. General colour rather greyish or drabby buff, but of the only two available skins one has been exhibited for many years and the other skinned out of spirit. Underside white, the hairs slaty at base. Light ear-patches little developed. Tail rather shorter than head and body, dull whitish or buffy whitish on the sides and for its whole length below, slightly darkened above by blackish hairs, but very little tufted at the end, the longest hairs barely 10 mm. in length.

Skull, as compared with that of *M. guyoni*, the South-Algerian and Tripolitan representative of *M. shawi*, of similar general form, with comparatively small bullæ and small supramеatal triangles. Bullæ, however, slightly smaller, and interorbital breadth distinctly greater, this latter being the chief difference between the Egyptian and Algerian animals. Palatine foramina reaching to the level of the anterior root of m^1.

* P. Z. S. 1905, ii. p. 523.

Dimensions of the type (measured on a skin):—

Head and body 140 mm.; tail 131; hind foot 32·5.

Skull: median length 39; diagonal length 39; zygomatic breadth 23·5; nasals 14·3; interorbital breadth 8; bimeatal breadth 21; palatine foramina 7·6; upper molar series 5·6. Bullæ: diagonal length 14; meatal length (back of bulla to front of meatal swelling) 11; suprameatal triangle, length 3·9, height 3·1.

Hab. Lower Egypt. Type from Ramleh, near Alexandria.

Type. Adult male. B.M. no. 92. 7. 1.·6. Collected and presented by Dr. John Anderson.

This is in part the "*Meriones shawi*, var. *melanurus*" of Anderson and de Winton's 'Mammals of Egypt,' but, as already explained, it seems best to apply the name *melanurus* to the form which has the prominent black tuft to the tail, and so agrees with Rüppell's figure and description. That name being disposed of, and the species being distinguished from the Algerian *guyoni* by its broader interorbital region, a new name becomes necessary for it.

Meriones blackleri lycaon, subsp. n.

General characters of true *blackleri* of Smyrna, but the colour warmer and more ochraceous and the tail without the white tip which occurs in all our four specimens of *blackleri*. Colour of back approaching cinnamon-buff; belly-hairs white to their bases. A whitish patch between eye and muzzle, behind eyes, and a small one behind ears. Hands and feet white; soles with but a narrow area along the centre of the proximal half naked. Tail buffy whitish, the terminal crest extending for about 2 inches at its end, not heavily developed, blackish, not becoming white at the extreme tip.

Skull averaging rather larger than in *blackleri*, but the specimens are mostly older. Palatine foramina ending quite in front of the roots of m^1, those of *blackleri* attaining the level of these latter. Bullæ slightly larger.

Dimensions of the type:—

Head and body 129 mm.; tail 146; hind foot 33; ear 20.

Skull: greatest median length 41; diagonal length to back of bullæ 41; zygomatic breadth 22·4; nasals 17·7; breadth across brain-case 17·1; bimeatal breadth 20; palatal foramina 7·3; upper molar series 5·2. Bullæ: length 12·8; front of meatal swelling to back of bulla 9.

Hab. Kara Dagh, Lycaonia, Asia Minor. Alt. 3800′.

Type. Adult male. B.M. no. 8. 7. 1. 28. Original

number 18. Collected 3rd June, 1907, and presented by L. H. G. Ramsay, Esq. Five specimens.

It so happens that all the five specimens of this highland gerbil are older than any of the four of true *blackleri* from comparatively low down at Smyrna; but if the colour is affected by this fact, and even possibly the relative position of the palatine foramina and teeth, the constant presence in *blackleri* and absence in *lycaon* of a white tip to the tail seem to justify a special subspecific name for the highland form.

XXVII.—*Notes on the Family* Dendrocolaptidæ, *with Suggestions for its Division*. By CHARLES CHUBB, F.Z.S., M.B.O.U., Zoological Department, British Museum (Natural History).

WHEN the late Dr. P. L. Sclater wrote the fifteenth volume of the 'Catalogue of the Birds in the British Museum' he included in the family Dendrocolaptidæ the ground-birds, bush-birds, and tree-climbing birds, dividing them into the following subfamilies:—Furnariinæ, Synallaxininæ, Philydorinæ, Sclerurinæ, and Dendrocolaptinæ. This was followed by the late Dr. Bowdler Sharpe in the 'Hand-list of Birds,' vol. iii. 1901, with two additional subfamilies, viz., Margarornithinæ and Glyphorhinæ, which had been established by Salvin and Godman (Biol. Centr.-Amer., Aves, ii. pp. 109, 171). Professor Ridgway, in his 'Birds of North and Middle America,' vol. v. pp. 157–295 (1911), has divided these into two families under the following titles:—Furnariidæ and Dendrocolaptidæ. Brabourne and Chubb, in their 'List of the Birds of South America,' did not recognize any of the divisions mentioned above, but simply included them all under the family Dendrocolaptidæ.

It appears to me, however, that these may be divided into four families, the first to include those that are essentially ground-birds—Furnariidæ—with the following genera:—

Geobates, Swains., 1838.
Geositta, Swains., 1837.
Furnarius, Vieill., 1816.
Upucerthia, Geoffr. Saint-Hilaire, 1832.
Cinclodes, Gray, 1840.

Eremobius, Gould, 1839.
Chilia, Salvad., 1908.
Clibanornis, Scl. & Salv., 1873.
Lochmias, Swains., 1827.
Sclerurus, Swains., 1827.

It must be mentioned, however, that the limits of this family are entirely different to those of Ridgway, who uses the same title.

The second to include the soft-tailed and bush-haunting birds—Synallaxidæ—with the following genera:—

Aphrastura, Oberh., 1899.
Sylviorthorhynchus, Des Murs, 1847.
Schizœaca, Cab., 1873.
Phleocryptes, Cab. & Hein., 1859.
Leptasthenura, Reichenb., 1853.
Synallaxis, Vieill., 1819.
Siptornis, Reichenb., 1853.
Metopothrix, Scl. & Salv., 1866.
Xenerpestes, Berl., 1886.
Pseudocolaptes, Reichenb., 1853.
Coryphistera, Burm., 1860.
Anumbius, d'Orb. & Lafr., 1838.
Thryolegus, Oberh., 1899.
Limnornis, Gould, 1841.
Berlepschia, Ridgw., 1887.
Phacellodomus, Reichenb., 1853.
Thripophaga, Cab., 1847.
Pseudoseisura, Reichenb., 1853.
Automolus, Reichenb., 1853.
Philydor, Spix, 1824.
Thripadectes, Scl., 1862.
Ancistrops, Scl., 1862.
Heliobletus, Reichenb., 1853.
Anabazenops, Lafr., 1847.
Xenicopsis, Cab. & Hein., 1859.

The third to include the genera *Xenops* and *Pygarrhicus*, which appear to me to be intermediate between the Synallaxidæ and Dendrocolaptidæ, and for which I propose the name Xenopidæ:—

Xenops, Illiger, 1811.
Pygarrhicus, Burm., 1837.

The fourth to include the spine-tailed and tree-climbing birds—Dendrocolaptidæ—with the following genera :—

Margarornis, Reichenb., 1853.
Premnornis, Ridgw., 1909.
Premnoplex, Cherrie, 1891.
Glyphorhynchus, Wied., 1831.
Dendrocincla, Gray, 1840.
Sittasomus, Swains., 1827.
Deconychura, Cherrie, 1891.
Xiphorhynchus, Swains., 1827.
Dendroplex, Swains., 1827.
Dendrexetastes, Eyton, 1851.
Hylexetastes, Sclater, 1889.
Xiphocolaptes, Less., 1840.
Picolaptes, Less., 1830.
Nasica, Less., 1830.
Drymornis, Eyton, 1852.
Campylorhamphus, Bertoni, 1901.
Dendrocolaptes, Hermann, 1804.

It may be mentioned also that the limits of this family are not the same as those of Ridgway, who uses the same title.

XXVIII.—*Descriptions of New* Pyralidæ *of the Subfamilies* Crambinæ *and* Siginæ. By Sir George F. Hampson, Bart., F.Z.S., &c.

The following paper is a supplement to my classification of the Schœnobianæ and Crambinæ in the 'Proceedings of the Zoological Society of London' for 1895, pp. 897 to 974.

The name of the former family has been changed, as *Siga* Hübn. is the oldest-described genus contained in it.

The types of the new species are in the British Museum, unless otherwise stated.

Family **Pyralidæ**.

Subfamily *Crambinæ*.

Genus Neargyria.

(2) *Neargyria persimilis*, sp. n.

Silvery white; palpi orange at sides; thorax with paired dorsal orange stripes; fore and mid legs and dorsal surface of abdomen tinged with ochreous. Fore wing with fine orange fasciæ on basal

third of costa and on inner margin except at base; an oblique orange band from three-fourths of costa, along which it is diffused to apex, to middle of inner margin; a fine dark brown terminal line; cilia tinged with fulvous; the underside of fore wing and costal area of hind wing tinged with brown.

Hab. D'Entrecasteaux Is., Goodenough I. (*Meek*), 1 ♂; Woodlark I. (*Meek*), 1 ♀ type. *Exp.* 18 mm.

(1 *a*) *Ptochostola metascotiella*, sp. n.

Head and thorax dark brown; abdomen blackish with grey segmental rings. Fore wing dark red-brown with a white fascia from base through the cell to the submarginal line, intersected beyond the cell by an oblique rufous line, its medial part defined by a slight black streak below; some silvery scales at upper angle of cell and streaks on veins 2 and 3; a silvery submarginal line, obtusely angled on vein 5; an oblique white streak from apex and line on apical part of margin; the inner half of outer area dark grey with marginal series of black specks. Hind wing dark fuscous.

Hab. Cape Colony, Annshaw (*Miss F. Barrett*), 4 ♂ type. *Exp.* 14 mm.

(1 *c*) *Culladia albimedialis*, sp. n.

♂. Head and thorax white slightly tinged with red-brown; abdomen white; pectus and legs white, the fore tibiæ and the tarsi tinged with red-brown. Fore wing white tinged with red-brown, the costal area, cell, and an oblique shade from its extremity to apex silvery white, leaving the costal edge tinged with red-brown to near apex; a slight oblique red-brown line from apex defining the lower edge of the white shade. Hind wing white with a very faint red-brown tinge. Underside of fore wing wholly tinged with red-brown.

Hab. Queensland, Peak Downs, 1 ♂ type. *Exp.* 20 mm.

(1 *e*) *Culladia irroralis*, sp. n.

♂. Head, thorax, and abdomen white; antennæ tinged with red-brown; palpi, pectus, and legs white tinged with red-brown. Fore wing white irrorated with red-brown, rather more thickly on costal and terminal areas; indistinct diffused oblique antemedial and medial lines from cell to inner margin; a distinct oblique red-brown line from apex to inner margin beyond middle with faint diffused streaks beyond it in the interspaces; a fine red-brown terminal line and a line near tips of cilia. Hind wing white. Underside of fore wing tinged with red-brown.

Hab. Br. E. Africa, Kikuyu, Roromo Flat (*Crawshay*), 1 ♂ type. *Exp.* 18 mm.

(1*f*) *Culladia dentilinealis*, sp. n.

♀. Head, thorax, and abdomen white mixed with pale red-brown; palpi white with fuscous bands towards extremity of 2nd joint and at base of 3rd joint; ventral surface of abdomen white. Fore wing white suffused with pale red-brown, the terminal area finely striated with darker brown and with a dark patch on costa before apex; an oblique red-brown antemedial shade from submedian fold to inner margin; a red-brown shade from costa to below end of cell, with a white patch beyond it before the slight red-brown postmedial line which is obliquely excurved to vein 5, then incurved, again excurved above the submedian fold in which it is retracted to below the origin of vein 2, then oblique to inner margin; subterminal line white slightly defined on each side by red-brown, angled outwards below the dark costal patch, then rather irregularly dentate; a fine black terminal line and a brown line near base of cilia. Hind wing white suffused with red-brown. Underside white suffused with brown.

Hab. Punjab, Simla (*Pilcher*), 2 ♀ type. *Exp.* 20 mm.

(1*h*) *Culladia sinuimargo*, sp. n.

Fore wing with veins 4, 5 from the cell, the termen sinuous, the anal tuft of male very large.

Head and thorax white irrorated with dark brown; antennæ dark brown; palpi banded with black at sides; abdomen white tinged with rufous, the anal tuft of male fulvous ochreous; pectus, legs, and ventral surface of abdomen white. Fore wing white irrorated with dark brown and some black, the terminal area finely pencilled with blackish; postmedial line white defined on each side by black-brown, oblique to vein 6 where it is angled outwards, then inwardly oblique with an angle outwards at vein 2, erect below vein 1, the veins beyond it with rather diffused black streaks, slightly forking before the subterminal line, which is red-brown, excurved below costa, then slightly waved; a fine black terminal line; cilia brownish, white at base towards apex. Hind wing white, the veins and terminal area except towards tornus suffused with reddish brown; cilia with a brown line near base to vein 2. Underside of fore wing suffused with red-brown except the inner area.

Hab. Transvaal, Pretoria (*Janse*), 4 ♂, 1 ♀ type. *Exp.* ♂ 22, ♀ 24 mm.

(1*i*) *Culladia innotalis*, sp. n.

Fore wing with the termen not sinuous.

♀. Head, thorax, and abdomen ochreous suffused with reddish brown, the vertex of head whitish; antennæ dark brown ringed with white; pectus, legs, and ventral surface of abdomen whitish, the fore and hind legs suffused with reddish brown. Fore wing

ochreous tinged with red-brown and slightly irrorated with greyish fuscous especially at termen in submedian fold and in discal fold in and beyond end of cell; cilia white tinged with ochreous. Hind wing white tinged with ochreous. Underside white suffused with brownish ochreous.

Hab. C. China, Fokien, Ting-hai (*de-la-Garde*), 1 ♀ type. *Exp.* 24 mm.

(1) *Eufernaldia micralis*, sp. n.

Fore wing with vein 11 anastomosing with 12; hind wing with veins 4, 5 from the cell.

♂. Head, thorax, and abdomen whitish suffused with brownish ochreous. Fore wing whitish suffused with brownish ochreous and slightly irrorated with blackish; a blackish point at origin of vein 2; a faint curved dark postmedial line between veins 7 and 2 with another faint curved line beyond it from costa to vein 3; a terminal series of minute black points from below apex to vein 2 and a slight brownish line near base of cilia. Hind wing white tinged with ochreous. Underside whitish suffused with brownish ochreous.

Hab. Jamaica, Constant Springs (*Walsingham*), 1 ♂ type. *Exp.* 12 mm.

Genus Neerupa, nov.

Type, *N. argyrosticta*.

Proboscis minute; palpi downcurved, extending about twice the length of head and clothed with long rough scales; maxillary palpi strongly dilated with scales; frons smooth; eyes large, round; antennæ of male laminate and fasciculate; tibiæ smoothly scaled. Fore wing with the termen somewhat excised from apex to vein 4; vein 3 typically from well before angle of cell; 5 from above angle; 6 from well below upper angle; 7, 8, 9, 10 stalked; 11 from cell. Hind wing with vein 3 typically from well before angle of cell; 5 from above angle; 6, 7 shortly stalked; 8 anastomosing with 7.

(1) *Neerupa benepunctalis*, sp. n.

Fore wing with the termen rather strongly excised from apex to vein 4; vein 3 from close to angle of cell and 4, 5 from angle. Hind wing with vein 3 from close to angle of cell, 4, 5 shortly stalked, and 6, 7 from upper angle.

Head, thorax, and abdomen white suffused with red-brown. Fore wing whitish suffused with red-brown; the costal area white to beyond middle; a faint diffused dark postmedial line, excurved to vein 4, then incurved to middle of inner margin, the area beyond it rather whiter below vein 2; an indistinct double curved punctiform subterminal dark line filled in with slight whitish marks; a terminal series of prominent black points defined on inner side

by white marks. Hind wing and underside white suffused with brown.

Hab. COLOMBIA, Choko, La Silva San Juan, 1 ♂; PERU, Carabaya, Oconeque (*Ockenden*), 1 ♀ type. *Exp.* 22 mm.

(2) *Necrupa argyrosticta*, sp. n.

Fore wing with the termen slightly excised from apex to vein 4; both wings with vein 3 from well before angle of cell and 5 from above angle; hind wing with veins 6, 7 shortly stalked.

♂. Head and thorax deep rufous with a golden gloss; abdomen paler golden rufous. Fore wing deep rufous with a golden gloss; a silvery white medial line, excurved to median nervure, then oblique; a diffused whitish discoidal spot; an indistinct rather diffused red-brown postmedial line, somewhat narrowed towards costa, then oblique, a silvery white spot tinged with blue on it at costa and minute streaks at veins 7, 6, the veins beyond it slightly irrorated with bluish white scales; a terminal series of silvery white bars tinged with blue; cilia chequered with white at tips. Hind wing white tinged with rufous; a faint reddish brown subterminal line; a rufous terminal line. Underside of fore wing glossy red-brown, the costal area towards apex and the terminal area yellowish rufous. Hind wing with the costal and terminal areas suffused with rufous, the brown subterminal line distinct.

Hab. COLOMBIA, San Antonio (*Palmer*), 2 ♂ type; W. slopes, 1 ♂. *Exp.* 32 mm.

(5 *a*) *Crambus mesoscia*, sp. n.

♂. Head, thorax, and abdomen creamy white, the patagia suffused with red-brown except dorsally, the dorsum of thorax with brown streaks; antennæ rufous except above; frons at sides and palpi except above red-brown; legs suffused with red-brown. Fore wing creamy white slightly irrorated with brown; a rather diffused black-brown streak along median nervure with red-brown shades above and below it between discal and submedian folds, expanding beyond the cell to termen and with slight red-brown streaks above it in the interspaces towards apex; a terminal series of prominent black points; cilia with red-brown line near base and some red-brown at tips. Hind wing silvery white with minute dark points on termen from apex to below vein 3. Underside of fore wing except the costal edge on terminal half and the costal area of hind wing suffused with red-brown.

Hab. NATAL, Durban (*Leigh*), 1 ♂; CAPE COLONY, Kokstad (*Mrs. Pringle*), 1 ♂ type. *Exp.* 32 mm.

(6 *c*) *Crambus diodontu*, sp. n.

♀. Head, thorax, and abdomen white tinged with rufous; palpi with their lower half red-brown. Fore wing white tinged with rufous in parts, a patch of rufous suffusion beyond lower angle of

cell and the terminal area more distinctly tinged with rufous; a punctiform red-brown medial line, oblique towards costa, angled outwards beyond the angles of cell, then inwardly oblique; postmedial line red-brown, punctiform, oblique to vein 6, inwardly oblique below vein 4 and ending at submedian fold; a terminal series of black-brown points. Hind wing creamy white. Underside white, the fore wing and costal area of hind wing tinged with rufous.

Hab. S. NIGERIA, Old Calabar (*Crompton*), 2 ♀ type. *Exp.* 22 mm.

(8 *a*) *Crambus niveicostellus*, sp. n.

♀. Head, thorax, and abdomen pure white, the patagia rufous except dorsally; antennæ rufous; palpi tinged with rufous except above towards tips; fore tibiæ and the tarsi tinged with rufous. Fore wing with silvery white costal stripe narrowing to a point at apex, the area below it cupreous rufous to submedian fold, then white tinged with rufous; slight white streaks on the veins beyond the cell and a distinct white streak on vein 1; a terminal series of slight red-brown striæ; cilia white, tinged with rufous towards apex. Hind wing silvery white. Underside silvery white.

Hab. BR. E. AFRICA, Shambe (*Betton*), 1 ♀ type. *Exp.* 30 mm.

(13 *a*) *Crambus undilineatus*, sp. n.

Head and thorax grey-white mixed with red-brown, the head white, the antennæ and palpi with more red-brown; abdomen, pectus, and legs white tinged with red-brown, the fore legs deep red-brown on inner side. Fore wing grey-white thickly irrorated with red-brown, especially towards costa; an obscure whitish spot in the cell towards extremity and discoidal annulus open above; postmedial line whitish defined on each side by red-brown, minutely waved, obliquely excurved to submedian fold, then oblique; a terminal series of black points; cilia white with brown lines near base and tips. Hind wing white tinged with red-brown. Underside of fore wing suffused with red-brown.

Hab. BR. E. AFRICA, Eb Urru (*Betton*), 1 ♂; TRANSVAAL, White R. (*Cooke*), 1 ♂ type, Pretoria (*Distant*), 3 ♂, 2 ♀; CAPE COLONY, Brak Kloop (*G. White*), 1 ♂. *Exp.* 22–26 mm.

(13 *b*) *Crambus albidorsatus*, sp. n.

♂. Head and thorax white with a slight cupreous tinge, the patagia cupreous brown; antennæ cupreous brown; palpi cupreous brown, white above on terminal half; abdomen, pectus, and legs white mixed with cupreous brown. Fore wing cupreous brown irrorated with whitish; the inner margin with white streak, the veins beyond the cell finely streaked with whitish; a small black

spot at origin of vein 2; a faint very oblique red-brown striga from middle of costa and slight marks at end of cell; postmedial line red-brown slightly defined on outer side by white and very oblique to vein 7, then represented by slight somewhat dentate red-brown marks defined on outer side by whitish and inwardly oblique to inner margin; a slight white mark at apex and fine black terminal line forming minute spots at the interspaces; cilia pale rufous with a silvery gloss. Hind wing whitish suffused with red-brown; a fine dark terminal line; cilia white. Underside whitish suffused with red-brown, the fore wing with indistinct curved brown postmedial line with a white mark on its outer side at costa.

Hab. SINGAPORE (*Ridley*), 1 ♂ type. *Exp.* 22 mm.

(13 *e*) *Crambus cuprescens*, sp. n.

♀. Head and thorax cupreous red-brown mixed with whitish; abdomen, pectus, and legs white tinged with cupreous brown, the fore tarsi red-brown ringed with white. Fore wing whitish tinged with cupreous and thickly irrorated with red-brown; traces of a red-brown medial line, excurved at end of cell, then incurved and again slightly excurved above inner margin; a faint slightly sinuous red-brown postmedial line, excurved below costa, then oblique; a fine slightly waved red-brown terminal line. Hind wing white with a faint cupreous tinge. Underside white, the fore wing and costal area of hind wing tinged with red-brown.

Hab. JUAN FERNANDEZ (*J. J. Walker*), 1 ♀ type. *Exp.* 24 mm.

(13 *f*) *Crambus cinereus*, sp. n.

♀. Head and thorax grey-brown with a slight leaden gloss; abdomen white tinged with brown, the anal tuft tinged with rufous. Fore wing grey-brown with a slight leaden gloss; a faint oblique dark bar from middle of costa and slight mark at lower angle of cell; postmedial line indistinct, dark, formed by striæ in the interspaces, excurved to vein 4, then oblique; a terminal series of black points; cilia white tinged with brown and with a white line at base. Hind wing white, the costal area and termen to vein 2 with a faint red-brown tinge. Underside of fore wing and costal area of hind wing tinged with red-brown.

Hab. DUTCH N. GUINEA, Mimika R. (*Wollaston*), 1 ♀ type, Wataikwa R. (*Wollaston*), 1 ♀. *Exp.* 24 mm.

(13 *g*) *Crambus melanerges*, sp. n.

Head, thorax, and abdomen black-brown with a leaden gloss, the last with the sides whitish; pectus and legs with some white. Fore wing uniform black-brown with a silvery leaden gloss. Hind wing tinged with brown. Underside of fore wing and costal area of hind wing greyish fuscous.

Hab. SIERRA LEONE (*Clements*), 1 ♀; UGANDA (*W. B. Gill*), 1 ♂, 1 ♀ type. *Exp.* 20–22 mm.

(14 *b*) *Crambus discistrigatus*, sp. n.

Head and thorax pale olive-brown; antennæ brown, whitish towards base; palpi irrorated with white; abdomen, pectus, and legs whitish suffused with red-brown. Fore wing pale olive-brown, the costal area darker and the costal edge white; a white fascia above median nervure from before middle of cell forming rather diffused streaks beyond the cell on veins 6 to 4; a fine dark terminal line; cilia whitish at base with a fine brown line near base. Hind wing pale grey-brown, the cilia white. Underside whitish suffused with grey-brown.

Hab. PUNJAB, Hundes, 1 ♂, 1 ♀ type. *Exp.* 28 mm.

(14 *d*) *Crambus medioradiellus.*

Head and thorax pale red-brown; abdomen yellowish white. Fore wing pale ferruginous irrorated with white scales; a white fascia in submedian fold from base to near outer margin; traces of a curved medial line; a more distinct submarginal line oblique from costa to vein 5 where it is angled, then outwardly defined by white; a marginal series of black points; cilia whitish with a brown line through them. Hind wing yellowish white.

Hab. QUEENSLAND, Cooktown, Cedar Bay (*Meek*), 2 ♂, 1 ♀ type. *Exp.* 20 mm.

(16 *b*) *Crambus calamellus*, sp. n.

Head, thorax, and abdomen white tinged with reddish ochreous; antennæ and palpi more rufous. Fore wing white suffused with reddish ochreous and irrorated with brown, the costa brownish towards base; postmedial line brown, very obliquely excurved from costa to vein 4, then inwardly oblique; subterminal line brown, obliquely excurved from costa to vein 4, then rather inwardly oblique and sinuous; a terminal series of minute black points from apex to vein 2; cilia white at base with a fine brown line near base. Hind wing silvery white with a faint red-brown tinge on apical half of terminal area.

Hab. PARAGUAY, Santa Cruz (*Moor*), 1 ♀; ARGENTINA, Santa Fé, Ocampo (*Wager*), 1 ♀, Florenzia, Gran Chaco (*Wagner*), 1 ♀, Goya (*Perrens*), 4 ♂, 1 ♀ type. *Exp.* 18–20 mm.

(21 *a*) *Crambus diascia*, sp. n.

♀. Head, thorax, and abdomen white tinged with red-brown, the patagia red-brown; antennæ fuscous except at base; palpi reddish brown at sides. Fore wing white tinged in parts with reddish brown and with a darker brown shade from median nervure to above inner margin to the postmedial line, which is slight, brown, very oblique to vein 7, then minutely waved, incurved

below discal fold and angled outwards at submedian fold; an indistinct curved minutely waved pale brown subterminal line; a terminal series of black points to submedian fold; cilia silvery white at base, tinged with red-brown at tips. Hind wing white, the termen tinged with red-brown to vein 2; cilia silvery white. Underside of fore wing suffused with red-brown except the inner area.

Hab. PARAGUAY, Sapucay (*Foster*), 2 ♀ type. *Exp.* 22 mm.

(21 *b*) *Crambus bidentellus*, sp. n.

Crambus racabellus, Druce, Biol. Cent.-Am., Het. ii. p. 290 (part.).

♀. Head and tegulæ creamy white; thorax and abdomen white suffused with red-brown; antennæ and palpi at sides red-brown. Fore wing white tinged with red-brown and slightly irrorated with darker brown; antemedial line represented by a slight blackish striga in the cell and dentate mark at vein 1; an indistinct blackish medial line, strongly angled outwards at discal fold beyond the cell, then oblique and angled outwards at submedian fold, obsolete below vein 1; an indistinct curved postmedial line from costa to vein 2, with a blackish shade before it except towards costa; a minutely waved pale red-brown subterminal line slightly defined on outer side by silvery white, the area beyond it finely pencilled with brown; a terminal series of minute black points to submedian fold. Hind wing white faintly tinged with red-brown, the cilia pure white. Underside white tinged with red-brown.

Hab. MEXICO, Durango (*Becker*), 1 ♀ type, Godman-Salvin Coll. *Exp.* 26 mm.

(23 *b*) *Crambus atristrigellus*, sp. n.

Head, thorax, and abdomen fuscous brown largely mixed with white, the inner area and still more the costal area strongly irrorated with bright rufous; the medial line represented by an oblique white streak from costa and oblique rufous line on inner area; the postmedial line white defined by bright rufous, oblique towards costa, angled at vein 6, and with a triangular rufous spot beyond it on costa; a terminal series of short black streaks; cilia rufous.

Hab. JAMAICA, Mandeville (*Cockerell*), 1 ♂ type, Newcastle, 1 ♀. *Exp.* 14 mm.

(24 *c*) *Crambus melanolepis*, sp. n.

♂. Head, thorax, and abdomen white with some black-brown scales; antennæ tinged with red-brown; palpi, pectus, legs, and ventral surface of abdomen white, the maxillary palpi blackish above, the fore tibiæ blackish below and the mid and hind tibiæ with blackish rings at extremities. Fore wing white, the costa with some dark brown towards base; an oblique slightly sinuous

black antemedial line from costa to submedian fold with a patch of black scales beyond it above vein 1; a rather oblique wedge-shaped discoidal spot tinged with red-brown and defined by black scales, angled outwards beyond the cell; a slight dark subterminal line, oblique towards costa and with a patch of black scales beyond it, then minutely waved; a slight dark line before termen and a fine black terminal line; cilia with some black scales at tips. Hind wing white, the terminal area faintly tinged with red-brown; a fine dark terminal line and lunulate black mark at tornus with a black bar beyond it on the cilia. Underside white tinged with red-brown.

Hab. PERU, R. Pacaya, 1 ♂ type. *Exp.* 16 mm.

(31 *a*) *Crambus melaneurus*, sp. n.

♂. Head and thorax white with a yellow tinge in parts; antennæ brownish except above; palpi with some dark brown at sides; abdomen white suffused with brown; pectus and legs white tinged with yellow-brown. Fore wing silvery white, the costal area to discal fold and the area beyond the cell suffused with golden yellow, narrowing to tornus; streaks of diffused black scales below costa and in upper part of cell from near base to end of cell and similar streaks in the interspaces beyond the cell to below vein 2; a terminal series of prominent black points; cilia brown glossed with metallic silver. Hind wing white tinged with fuscous brown especially on costal half, the cilia pure white. Underside of fore wing fuscous, the terminal half of costa golden yellow, the termen white; hind wing white tinged with fuscous except at termen.

Hab. PUNJAB, Dalhousie (*Barrow*), 1 ♂ type. *Exp.* 22 mm.

(44 *a*) *Crambus minimellus*, sp. n.

Head, thorax, and abdomen white tinged with ochreous; antennæ brownish except towards base. Fore wing pale ochreous; a rather diffused blackish medial line, oblique to submedian fold, then inwardly oblique; a rather diffused dark postmedial line defined on outer side by whitish, obliquely excurved to discal fold, then rather inwardly oblique and ending at submedian fold; blackish points on termen at veins 4, 3, 2. Hind wing white, the termen tinged with brown except towards tornus. Underside of fore wing tinged with brown except on inner area.

Hab. BR. GUIANA, Bartica (*Parish*), 2 ♂, 1 ♀ type. *Exp.* 10 mm.

(54 *a*) *Crambus dichotomellus*, sp. n.

♂. White; patagia tinged with pale rufous; abdomen irrorated with fuscous. Fore wing irrorated with fuscous; a black line from base through the cell obsolescent towards outer margin and defined by pure white below; very pale rufous suffusion on costal area and below base of median nervure.

Hab. CAPE COLONY, Annshaw (*Miss F. Barrett*), 1 ♂ type, Grahamstown, 1 ♂, Zuurberg (*Bairstowe*), 1 ♂. *Exp.* 24 mm.

(54 *b*) *Crambus ellipticellus*, sp. n.

♂. Head, thorax, and abdomen dirty white, the two latter suffused with pale brown; palpi brownish at sides. Fore wing somewhat elliptical and rounded at apex, white, the interspaces of costal half and the whole inner half suffused with pale brown leaving an almost pure white streak from base along median nervure to outer margin; the inner half irrorated with erect black scales of which there are a few on costal half also; a terminal series of black points. Hind wing white, the apical area suffused with brownish.

Hab. NATAL, Estcourt (*Hutchinson*), 2 ♂ type. *Exp.* 26–28 mm.

(62 *a*) *Crambus elongatus*, sp. n.

♂. Head, thorax, and abdomen white with a reddish ochreous tinge; antennæ fuscous; palpi with some blackish at sides, white above and below; pectus and legs suffused with fuscous. Fore wing white tinged with reddish ochreous leaving the costal area pure white except towards base; irrorated with a few black scales especially in submedian interspace and beyond the cell; a terminal series of black points to vein 3; cilia pure white. Hind wing white with a slight reddish ochreous tinge, the cilia pure white. Underside of fore wing suffused with fuscous brown, the terminal area white; hind wing white, the costal area tinged with brown.

Hab. CHILI, Chillan, 8000′ (*Elwes*), 2 ♂ type. *Exp.* 40 mm.

(77 *a*) *Crambus tripartitus*, sp. n.

♂. Head white, the antennæ and palpi black; thorax black with a cupreous gloss and with dorsal white stripe; abdomen white with reddish brown hair on dorsum towards base; pectus and ventral surface of abdomen white suffused with cupreous brown; legs cupreous black-brown, the hind tibiæ streaked with white above. Fore wing with the costal area cupreous black-brown; a silvery white stripe through the cell and thence obliquely to apex, a broad cupreous black-brown stripe below it; the inner area silvery white with some cupreous brown scales on terminal half of inner margin and irroration on tornal area; a terminal series of black points from below apex to vein 2; cilia white with cupreous brown line near base except towards apex and some cupreous brown at tips. Hind wing silvery white. Underside with the fore wing and costal area of hind wing suffused with brown, leaving some white in and just beyond the cell of fore wing.

Hab. NATAL, Maritzburg (*Burnup*), 1 ♂ type. *Exp.* 24 mm.

(77 *c*) *Crambus chalcimerus*, sp. n.

♂. Head and thorax silvery white, the tegulæ, except dorsally, and patagia cupreous yellow; antennæ tinged with fuscous; palpi dark brown mottled with white; abdomen white dorsally suffused with cupreous yellow towards base; pectus, legs, and ventral surface of abdomen with some brown suffusion. Fore wing with the

costal area to discal fold cupreous yellow leaving the costal edge white; a silvery white stripe along median nervure and below discal fold to termen, a cupreous yellow stripe below its basal half, the inner area silvery white tinged and slightly irrorated with brown. Hind wing white suffused with reddish brown, the cilia pure white. Underside suffused with red-brown, the inner area of hind wing whiter.

Hab. Basutoland, Masite (*Crawshay*), 1 ♂ type, Mohalishoek (*Crawshay*), 2 ♂. *Exp.* 24 mm.

(128 *a*) *Crambus micralis*, sp. n.

Head white; thorax whitish mixed with cupreous brown; abdomen whitish with a slight cupreous tinge; antennæ brownish; pectus and legs whitish suffused with cupreous brown. Fore wing whitish tinged with cupreous and irrorated with dark brown; a patch of dark brown scales below middle of cell; postmedial line brown, oblique from costa to discal fold, where it is angled outwards, then inwardly oblique to middle of inner margin, forming a diffused spot at submedian fold; subterminal line double, dark cupreous brown, minutely waved, rather oblique towards costa, the inner line incurved at discal fold and curved inwards to inner margin; a black-brown terminal line; cilia white with a silvery gloss. Hind wing white tinged with brown, the cilia pure white. Underside of fore wing tinged with red-brown.

Hab. Cuba, Tanamo (*Schaus*), 2 ♂, 2 ♀; Colombia, Honda, 1 ♂ type. *Exp.* 12 mm.

(131 *a*) *Crambus argentimaculalis*, sp. n.

Head, tegulæ, and patagia white; palpi banded with brown; thorax brown; pectus and legs white, the tarsi banded with brown; abdomen fuscous above, white below. Fore wing red-brown; a large triangular white antemedial patch narrowing from below costa to inner margin; a diamond-shaped postmedial spot on costa and a sexagonal patch extending from vein 3 to inner margin; the fine postmedial line oblique from costa to vein 5, then joining the large patch at tornus; an apical spot; a fine dark terminal line; cilia white and rufous. Hind wing white tinged with yellow in male, with fuscous in female.

Hab. Brazil, Petropolis (*Doer*), 1 ♂, 1 ♀ type, Sao Paulo (*D. Jones*), 1 ♂, Castro Paraña (*D. Jones*), 1 ♀. *Exp.* 16 mm.

(131 *b*) *Crambus reseda*, n. n.

Culladia mignonette, Dyar, Insec. Incit. Menstr. ii. p. 164 (1914), nom. prav.

Br. & Fr. Guiana.

(131 *d*) *Crambus argyriplagalis*, sp. n.

♀. Head and thorax brown; palpi white mixed with brown; tegulæ and patagia, pectus and legs white; abdomen fuscous above, white below. Fore wing red-brown; some white at base of

inner margin; a broad white antemedial band; a similar postmedial band with sinuous edges, its outer edge dentate below costa with an oblique striga from costa beyond it; a white patch at apex and another on termen from vein 4 to tornus; cilia white, silvery at middle. Hind wing white strongly tinged with fuscous.

Hab. SURINAM, Paramaribo (*Ellacombe*), 1 ♀. *Exp.* 14 mm. Type in Coll. Rothschild.

(132 *a*) *Crambus tessellatus*, n. sp.

♂. Head and thorax white mixed with dark cupreous brown; abdomen white suffused with brown; antennæ brownish; palpi cupreous brown, white above and below; pectus and legs white suffused with cupreous brown. Fore wing silvery white irrorated with some cupreous brown scales; a small rather wedge-shaped black-brown antemedial mark in cell and streak above inner margin; an ill-defined spot in middle of cell; a narrow cupreous brown medial band, oblique to middle of discocellulars, where there is an ill-defined black spot on it, then inwardly oblique and with elongate black mark on it below end of cell; an incomplete cupreous brown annulus beyond end of cell; subterminal line double, rather diffused cupreous brown, rather oblique to discal fold, then inwardly oblique and with diffused black spots on the inner line below veins 4 and 1; a slight black-brown subapical spot; a fine black-brown terminal line. Hind wing white tinged with reddish brown; cilia white with a brown line near base. Underside of fore wing suffused with reddish brown.

Hab. BR. E. AFRICA, N'dimu (*Betton*), 1 ♂ type. *Exp.* 14 mm.

(134 *a*) *Crambus perdentellus*, sp. n.

Head and thorax white, the patagia suffused with red-brown; antennæ dark brown; palpi banded with dark brown; abdomen whitish suffused with brown; fore legs and the tarsi cupreous brown above. Fore wing white irrorated and in parts suffused with cupreous brown; the costal edge black-brown towards base; medial line double, dark brown, very oblique to discal fold beyond the cell, where it is acutely angled outwards, then inwardly oblique, diffused and waved below the cell; subterminal line double, dark brown, obliquely excurved to discal fold, where it is angled outwards and also below vein 4, then strongly angled inwards just above submedian fold and outwards just below it; a fine black terminal line; cilia with a dark line near base and some dark brown at tips. Hind wing white, tinged with brown especially towards termen; cilia pure white. Underside of fore wing and costal area of hind wing suffused with dark brown.

Hab. BR. C. AFRICA, Mlanje plateau, 6500′ (*Neave*), 2 ♂, 6 ♀ type. *Exp.* 22 mm.

(134 *b*) *Crambus apicenotatus*, sp. n.

♂. Head, thorax, and abdomen white tinged with reddish brown; antennæ ringed with brown; palpi brown mixed with

white. Fore wing tinged in parts and slightly irrorated with reddish brown; a dark streak in basal half of submedian fold and a blackish fascia in and beyond end of cell; slight diffused blackish marks beyond upper and lower angles of cell; the veins beyond the cell with slight white streaks defined by red-brown; subterminal line white defined on each side by brown, oblique to vein 6 near termen, then slightly sinuous, angled inwards at vein 2 and outwards at submedian fold, a semicircular chocolate-brown patch beyond it on apical part of costa; a fine dark terminal line; cilia with a dark line at middle. Hind wing white with a faint brown tinge; cilia with a pale brown line at middle. Underside of fore wing and costal area of hind wing tinged with brown.

Hab. Formosa, Banshorio (*Wileman*), 1 ♂ type. *Exp.* 12 mm.

(134 *c*) *Crambus distictellus*, sp. n.

♂. Head white; thorax and abdomen white with a slight cupreous tinge; antennæ tinged with brown; palpi at sides, pectus and legs suffused with cupreous brown. Fore wing silvery white tinged with cupreous brown; an indistinct cupreous brown medial line, angled outwards at discal fold beyond the cell, then inwardly oblique and slightly sinuous, black points on it at discal and submedian fold; subterminal line double, cupreous brown filled in with white, very minutely waved, oblique to discal fold, then inwardly oblique and slightly incurved at submedian fold where there is a black point on the inner line; a dark cupreous brown terminal line; cilia silvery white at base, cupreous at tips. Hind wing silvery white with a faint cupreous tinge on costal area; a slight brown terminal line to vein 2. Underside of fore wing and costal area of hind wing suffused with cupreous brown.

♀. Thorax and fore wing more strongly suffused with cupreous.

Hab. Formosa, Takow (*Wileman*), 1 ♂, 1 ♀, Tainan (*Wileman*), 5 ♂ type, Anping (*Wileman*), 1 ♂, 1 ♀. *Exp.* 18 mm.

(134 *d*) *Crambus prodontellus*, sp. n.

Head, thorax, and abdomen white suffused in parts with cupreous; palpi grey-brown at sides; tarsi white ringed with brown. Fore wing silvery white tinged with cupreous; dark streaks on subcostal and median nervure, slight cupreous brown streaks below basal half of costa and in discal fold and a shade below median nervure to just beyond end of cell; medial line double, dark, very oblique to discal fold where it is angled outwards to well beyond the cell, then angled inwards to origin of vein 2 and ending at submedian fold; subterminal line golden cupreous, slightly defined on outer side by silver, indistinctly double and oblique to discal fold near termen, then inwardly oblique and slightly sinuous, an oblique wedge-shaped dark brown mark beyond it from apex, defined below by white; a series of short black streaks in the interspaces of terminal area to vein 2; a fine blackish terminal line; cilia with a blackish line near base and some dark scales near tips. Hind wing white tinged with

cupreous brown, a rather darker terminal line; cilia white with a slight cupreous brown line near base. Underside of fore wing and costal area of hind wing suffused with cupreous brown.

Ab. 1. Fore wing with the markings paler and much less distinct.

Hab. Br. E. Africa, Kikuyu, Kiu (*Crawshay*), 1 ♀; Transvaal, Groenvlei (*Janse*), 1 ♀, Doomfontein (*Janse*), 1 ♂, Pretoria (*Janse*), 1 ♂ type; Cape Colony, Zuurberg (*Bairstow*), 1 ♀. *Exp.* 18 mm.

(136 *a*) *Crambus diarhabdellus*, sp. n.

♀. Head and thorax white mixed with some black-brown; abdomen white, tinged with brown at base; antennæ brownish; palpi white above, brown below; legs streaked with brown. Fore wing white with slight red-brown irroration on costal half and more distinct irroration on inner half; a black streak on median nervure to end of cell and thence to the subterminal line below discal fold, defined below by a red-brown shade; a slight red-brown streak in discal fold beyond the cell; a slight red-brown line from middle of costa, angled outwards at discal fold to the subterminal line and ending at the black streak; subterminal line double, red-brown filled in with silvery white, obliquely excurved to discal fold, then rather oblique and sinuous, an oblique wedge-shaped black mark beyond it from apex and quadrate spots at discal and submedian folds; a fine black terminal line; cilia white, tinged with red-brown at tips. Hind wing white with a faint brownish tinge. Underside of fore wing and costal area of hind wing suffused with red-brown.

Hab. Sudan, Blue Nile (*Flower*), 1 ♀; Br. C. Africa, Mt. Mlanje (*Neave*), 1 ♀ type. *Exp.* 22 mm.

(138 *a*) *Crambus microstrigatus*, sp. n.

Head and thorax white, the tegulæ at sides and patagia tinged with reddish ochreous; palpi tinged with brown; abdomen creamy white; tarsi brown ringed with white. Fore wing silvery white with a faint cupreous tinge in the interspaces; a black discoidal point; a fine golden cupreous line from middle of costa, angled outwards at discal fold to far beyond the cell, then inwards to origin of vein 2 and ending at submedian fold; subterminal line golden cupreous defined on outer side by silver, double towards costa, obliquely excurved to discal fold, then oblique, a golden cupreous streak beyond it from apex; a series of minute black streaks before termen from below apex to vein 2; a fine golden cupreous terminal line; cilia with a golden cupreous line near base and some golden cupreous at tips. Hind wing silvery white with a faint red-brown tinge, the cilia pure white. Underside of fore wing and costal area of hind wing with a slight red-brown tinge.

Hab. Br. C. Africa, Mt. Mlanje (*Neave*), 1 ♂, 5 ♀ type. *Exp.* 20–22 mm.

* (138 *b*) *Crambus chionostola*, sp. n.

♀. Pure white. Fore wing with subbasal fulvous points in and below the cell; an oblique striga below costa before middle with a point on median nervure just beyond it and another striga on vein 1 nearer the base; a rather darker discoidal point; the postmedial line represented by an oblique striga from costa, with a longer and more oblique striga on its inner side to vein 7 where it is angled, then by a slightly incurved series of points; a terminal series of points; cilia chequered white and golden ferruginous. Hind wing with terminal ferruginous line from apex to vein 3.

Hab. Aldabra Is. (*Doherty*), type ♀ in Coll. Rothschild. *Exp.* 24 mm.

(138 *c*) *Crambus agraphellus*, sp. n.

♂. Head, thorax, and abdomen white with a faint ochreous brown tinge; antennæ tinged with fuscous. Fore wing white slightly tinged with ochreous brown; a slight rather oblique brown discoidal lunule; a faint curved slightly waved brownish subterminal line; a slight brown terminal line. Hind wing silvery white. Underside of fore wing and costal area of hind wing suffused with red-brown.

Hab. Seychelles Is., Aldabra (*Fryer*), 1 ♂ type. *Exp.* 16 mm.

(138 *d*) *Crambus monostictus*, sp. n.

♀. Head, thorax, and abdomen white; pectus, legs, and ventral surface of abdomen with a red-brown tinge. Fore wing white, the area beyond the cell tinged and irrorated with pale red-brown; a black discoidal point; traces of an obliquely curved red-brown line from costa beyond middle to middle of inner margin; a rather punctiform black terminal line; cilia with a fine black line near base and brownish line near tips. Hind wing silvery white with a slight red-brown terminal line except towards tornus. Underside of fore wing tinged with red-brown.

Hab. Br. C. Africa, Mpondas (*de Jersey*), 1 ♀ type. *Exp.* 18 mm.

(165 *a*) *Crambus argentictus*, sp. n.

Crambus quinqueareatus, Druce, Biol. Centr.-Am., Het. ii. p. 289 (nec Zell.).

Head and thorax golden cupreous; antennæ brown; palpi below and pectus in front white; abdomen whitish suffused with red-brown, the anal tuft whiter. Fore wing golden cupreous; a silvery white fascia from below costa to submedian fold, its lower edge very slightly angled at lower angle of cell, then narrowing to near termen and bent upwards as a wedge-shaped mark to apex; a slight dark streak below it in submedian fold to end of cell; postmedial line cupreous, oblique to discal fold, then inwardly oblique and

slightly sinuous, some slight white marks beyond it on costa and fine white pencillings below the fascia with short black streaks in the interspaces before termen to the submedian fold; a fine cupreous brown terminal line; cilia silvery white, tinged with cupreous brown at tips. Hind wing silvery white. Underside of fore wing white tinged with red-brown above and below the fascia which is faint and diffused.

Hab. MEXICO, Jalapa (*Trujillo*), 3 ♂, 6 ♀ type, Misantla (*Trujillo*), 1 ♀, Godman-Salvin Coll.; BAHAMAS, Andros (*Bonhote*), 1 ♂. *Exp.* 22–24 mm.

(167 *a*) *Crambus ruptifascia*, sp. n.

♀. Head and thorax cupreous brown; palpi white below at base; abdomen white, tinged with brown at base and more strongly on ventral surface. Fore wing cupreous brown; a silvery white fascia from base through the cell, ending in a point well beyond it, a short white streak on costa beyond middle and an oblique wedge-shaped mark from apex; a curved metallic silver subterminal line with a golden cupreous shade before it with slight silvery streaks before its inner edge; short black streaks in the interspaces before termen from below the oblique white mark to below vein 2; cilia silvery white tinged with red-brown and with a red-brown line near base. Hind wing whitish suffused with red-brown, the cilia white with a red-brown line near base. Underside of fore wing brown, of hind wing whitish suffused with brown.

Hab. MEXICO, Milpas (*Forrer*), 1 ♀ type, Godman-Salvin Coll. *Exp.* 30 mm.

(169 *a*) *Crambus aureorufus*, sp. n.

♂. Head and thorax cupreous red; antennæ brownish; palpi pale red-brown, white below; abdomen white tinged with red. Fore wing cupreous red, the inner area with a whitish tinge; a silvery white fascia from base through the cell, bidentate before the subterminal line and the upper tooth met by an oblique wedge-shaped silvery white mark from apex; a metallic silver subterminal line, oblique to vein 6; a series of short black streaks before termen from below the oblique white mark from apex to below vein 2; a blackish terminal line towards apex; cilia white tinged with rufous, pure white towards apex. Hind wing silvery white. Underside with the fore wing and costal area of hind wing rufous.

Hab. BRAZIL, São Paulo (*D. Jones*), 3 ♂ type. *Exp.* 26–30 mm.

(169 *b*) *Crambus brachiiferus*, sp. n.

♂. Head white; thorax cupreous with a white dorsal stripe; abdomen white tinged with red-brown; antennæ blackish; palpi pale brown at sides; pectus and ventral surface of abdomen white; legs pale brown. Fore wing cupreous; a silvery white fascia

defined by dark streaks from base through the cell, bifurcating and forming a lobster-claw mark before the subterminal line, the upper claw met by an oblique wedge-shaped silvery white mark from apex; a silvery white fascia from inner margin before middle to termen below vein 1, defined above and below by dark streaks except towards base; a white fascia below terminal part of submedian fold; subterminal line dark defined on each side by white and oblique to vein 6, then inwardly oblique and cupreous brown defined on outer side by silver; a triangular cupreous brown mark on apical part of costa; the terminal area white finely pencilled with cupreous brown below the oblique mark from apex and with fine black streaks in the interspaces to the submedian fold where the streak extends to before the subterminal line; the apex strongly produced and hooked, with a black line on termen towards apex; cilia white, tinged with cupreous towards tips. Hind wing silvery white tinged with red-brown, the cilia pure white. Underside of fore wing and costal area of hind wing suffused with red-brown.

Hab. Br. C. Africa (*Coryndon*), 1 ♂ type, Mt. Mlanje (*Neave*), 1 ♂; Mashonaland (*Dobbie*), 1 ♂ *Exp.* 20–24 mm.

(169 *c*) *Crambus infradentatus*, sp. n.

♂. Head and thorax white tinged with brown, the patagia rufous; palpi dark brown mixed with white, white above; abdomen white tinged with red-brown. Fore wing cupreous; the costal edge white except towards base; a silvery white fascia from base through the cell to the subterminal line where it is met by an oblique silvery white wedge-shaped mark from apex, its lower edge with a black tooth on base of vein 2 and its upper edge defined by a black streak on terminal half, the oblique mark from apex also defined by black lines at sides; a diffused silvery white fascia along vein 1; postmedial line cupreous, very obliquely excurved and defined below by white from middle of costa to discoidal fold, then defining the lower edge of the fascia to vein 3 where it terminates; subterminal line cupreous, oblique and defined on outer side by silvery white to discal fold, then inwardly oblique defined on outer side by metallic silver and ending at submedian fold; the terminal area white finely pencilled with cupreous brown and with black streaks in the interspaces from below the oblique mark from apex to submedian fold and with fine cupreous brown terminal line; cilia silvery white with a cupreous brown line near base becoming black towards apex. Hind wing silvery white. Underside of fore wing suffused with brown, the inner and terminal areas whitish, the termen with dark line towards apex, then a series of points to submedian fold; hind wing with the costal area tinged with red-brown.

Hab. Transvaal, White R. (*Cooke*), 1 ♂ type. *Exp.* 24 mm.

[To be continued.]